March

MODERN MECHANIX AND INVENTIONS

NOW 5¢

CANADA 20¢

NRA CODE

TAXI PLANE FOR NON-STOP AIR LINERS
SEE PAGE 83

David Sarnoff, RCA President, Predicts

Television Will Carry the Mails

SKINNY? ADD 5 TO 15 LBS. QUICK—THIS NEW EASY WAY!

NOW there's no need to be "skinny" and lose your chances of making friends. This new easy treatment is giving thousands solid, good-looking flesh—*in just a few weeks!*

As you know, doctors for years have prescribed yeast to build up health. But now with this new yeast discovery in pleasant tablet form, you can get far greater tonic results than with ordinary yeast—regain health, and also put on pounds of firm attractive flesh—*and in a far shorter time.*

Not only are thousands quickly gaining husky, handsome pounds, but also clear healthy skin, glorious new pep.

Concentrated 7 times

This amazing new product, Ironized Yeast, is made from specially cultured *brewers' ale yeast* imported from Europe —the richest yeast known—which by a new process is concentrated 7 times—*made 7 times more powerful.*

But that is not all! This marvelous, health-building yeast is then *ironized* with 3 special kinds of strengthening iron.

Day after day, as you take these little Ironized Yeast tablets, watch flat chest develop, skinny limbs round out attractively. Skin clears, new health comes—you're a new person.

Results guaranteed

No matter how skinny and weak you may be, this marvelous new Ironized Yeast should build you up in a few short weeks as it has thousands. If you are not delighted with the results of the very first package, your money back instantly.

Special FREE offer!

To start you building up your health *right away,* we make this absolutely FREE offer. Purchase a package of Ironized Yeast at once, cut out the seal on the box and mail it to us with a clipping of this paragraph. We will send you a fascinating new book on health, "New Facts About Your Body," by a well-known authority. Remember, results are guaranteed with very first package—*or money refunded.* At all druggists. Ironized Yeast Co., Inc., Dept. 563, Atlanta, Ga.

Posed by professional models

IF MEN WORE PRICE TAGS

HOW WOULD YOU FEEL?

WELL, your boss thinks of you in terms of so much a week! You are worth this or that to him. How much you are worth depends upon—YOU! You decide the amount chiefly by your ability—by your training. Why not increase the amount by increasing your training? Thousands of men have done it by spare-time study of I. C. S. Courses. You are invited to earn more money. Mail this coupon.

INTERNATIONAL CORRESPONDENCE SCHOOLS

★ *"The Universal University"* BOX 2322-B, SCRANTON, PENNA. ★

Without cost or obligation, please send me a copy of your booklet, "Who Wins and Why," and full particulars about the subject *before* which I have marked X:

TECHNICAL AND INDUSTRIAL COURSES

- ☐ Architect
- ☐ Architectural Draftsman
- ☐ Building Estimating
- ☐ Wood Millworking
- ☐ Contractor and Builder
- ☐ Structural Draftsman
- ☐ Structural Engineer
- ☐ Development and Protection of New Products
- ☐ Electrical Engineer
- ☐ Electric Lighting
- ☐ Welding, Electric and Gas
- ☐ Reading Shop Blueprints
- ☐ Telegraph Engineer
- ☐ Telephone Work
- ☐ Mechanical Engineer
- ☐ Mechanical Draftsman
- ☐ Machinist ☐ Toolmaker
- ☐ Patternmaker
- ☐ Heat Treatment of Metals
- ☐ Bridge Engineer
- ☐ Bridge and Building Foreman
- ☐ Gas Engines ☐ Diesel Engines
- ☐ Aviation Engines
- ☐ Automobile Mechanic
- ☐ Plumbing ☐ Steam Fitting
- ☐ Heating ☐ Ventilation
- ☐ Sheet Metal Worker
- ☐ Steam Engineer ☐ Civil Engineer
- ☐ Steam Electric Engineer
- ☐ Surveying and Mapping
- ☐ Refrigeration
- ☐ R. R. Locomotives
- ☐ R. R. Section Foreman
- ☐ R. R. Bridge and Building Foreman
- ☐ Air Brakes ☐ R. R. Signalman
- ☐ Highway Engineering
- ☐ Chemistry ☐ Pharmacy
- ☐ Coal Mining Engineer
- ☐ Navigation ☐ Air Conditioning
- ☐ Boilermaker
- ☐ Textile Overseer or Supt.
- ☐ Cotton Manufacturing
- ☐ Woolen Manufacturing
- ☐ Agriculture ☐ Fruit Growing
- ☐ Poultry Farming ☐ Radio
- ☐ Marine Engineer

BUSINESS TRAINING COURSES

- ☐ Business Management
- ☐ Office Management
- ☐ Industrial Management
- ☐ Traffic Management
- ☐ Accountancy
- ☐ Cost Accountant
- ☐ C. P. Accountant
- ☐ Bookkeeping
- ☐ Secretarial Work
- ☐ Spanish ☐ French
- ☐ Salesmanship
- ☐ Advertising
- ☐ Service Station Salesmanship
- ☐ First Year College
- ☐ Business Correspondence
- ☐ Lettering Show Cards ☐ Signs
- ☐ Stenography and Typing
- ☐ Civil Service ☐ Mail Carrier
- ☐ Railway Mail Clerk
- ☐ Grade School Subjects
- ☐ High School Subjects
- ☐ College Preparatory
- ☐ Illustrating
- ☐ Cartooning

Name..... Age..... Address.....

City..... State..... Occupation.....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

draw me!

COMPETE FOR AN *art* SCHOLARSHIP

Copy this girl and send us your drawing—perhaps you'll win a COMPLETE FEDERAL COURSE FREE! This contest is for amateurs, so if you like to draw do not hesitate to enter.

Prizes for Five Best Drawings—FIVE COMPLETE ART COURSES FREE, with drawing outfit. (Value of each course, $190.00.)

FREE! Each contestant whose drawing shows sufficient merit will receive a grading and advice as to whether he or she has, in our estimation, artistic talent worth developing.

Nowadays design and color play an important part in the sale of almost everything. Therefore the artist, who designs merchandise or illustrates advertising has become a real factor in modern industry. Machines can never displace him. Many Federal students, both men and girls who are now commercial designers or illustrators capable of earning from $1000 to $5000 yearly have been trained by the Federal Course. Here's a splendid opportunity to test your talent. Read the rules and send your drawing to the address below.

RULES FOR CONTESTANTS

This contest open only to amateurs, 16 years old or more. Professional commercial artists and Federal students are not eligible.

1. Make drawing of girl 5 inches wide, on paper 6½ inches square. Draw only the girl, not the lettering.
2. Use only pencil or pen.
3. No drawings will be returned.
4. Write your name, address, age and occupation on back of drawing.
5. All drawings must be received in Minneapolis by Feb. 25th, 1935. Prizes will be awarded for drawings best in proportion and neatness by Federal Schools Faculty.

FEDERAL SCHOOLS INC

Dept. 324E Federal Schools Bldg., Minneapolis, Minn.

PRICE 15 CENTS
(20 CENTS IN CANADA)

MODERN MECHANIX AND INVENTIONS

NRA CODE

MARCH
1935

Volume XIII
Number 5

CONTENTS

SPECIAL FEATURES

Stout Produces First Rear Engine Auto 35

Television Will Carry the Mails - - 36
By David Sarnoff—President R. C. A.

World's Longest Bridges Span San Francisco Bay - - - - - - 42
By Charles W. Geiger

Building a Gold Mine Fortune From a Four-Dollar Stake - - - - 48
By Arthur H. Carhart

New Contest Offers $125 in Cash; Winners of December Contest Announced 52

Sharp Shooting on the Bowling Alleys 56
By Elmer H. Baumgarten, Secretary of the American Bowling Congress

Slicing Sections for Microscope Work 61
By J. D. Corrington, Ph. D.

Training Transport Pilots for Highways of the Sky - - - - - - - 62
By Lieut. Corley McDarment

Around the World in Five Seconds - 65
Nic Sprank in Oddities of Science

How Customs Officials Expose Antique Fakers - - - - - - 68
By H. H. Slawson

Ancient Falconry Is Newest Hunting Sport - - - - - - - - - 74
By H. M. Robinson in Sportsmen's Campfire

Modernize Your Home at Small Cost - 84
By D. J. C. Parsons, Registered Architect

$125 IN CASH PRIZES Awarded DECEMBER WINNERS

Mechanical devices for the home will be awarded prizes in the fourth and final contest of a series offering $500 in cash prizes. Winners of the first $125 home improvement contest are announced in this issue.
FOR FULL DETAILS SEE PAGE 52.

SHORTER FEATURES

Paragraph Oddities of Science 40

All Metal Dirigible Lowers Passengers In Elevator Car 41

Mechanical Improvements Of 1935 Autos - - - - - 55

800-Mile Gas Pipe Line Burrows Through Five States 59

Diving Plane To Hurl Big Bomb - - - - - - 70

How Giant Hammers Forge Seamless Boilers - - - 79

Taxi Plane Picks Up Freight And Passengers For Airliner - - - - - - - 83

HOW-TO-BUILD FEATURES

Use 5-Meter Transceiver On Car Or Boat - - - - - 90

Filter Static From Radio Antenna - - - - - - 92

Ideas for Amateur Stage Prop Builders - - - 94

When You Change That Boat 100

Use Colonial Woodcraft On Four Poster Bed - - - 108

(Contents continued on page 6)

TABLE OF CONTENTS

(Continued From Page 5)

NEW MECHANICAL INVENTIONS

Triangle Works Problem Easily - - - 39
Farm Tractor Is Also War Tank - - - 39
Subway Slot Machines Eject Counterfeit Coins - - - - - - - - - 40
Starter Button Is Fool Proof - - - 40
Crystal Balls Predict Weather - - 46
Brake Tester Gives Four Readings - 46
Driver Faces Load On New Truck - 46
Automatic Control Guides Plane - - 47
Uncanny Machine Forecasts Death - 47
Tiny Motor Drives Cutting Torch - - 47
Tractor Walks; Has No Wheels To Slip - 51
Gold Ore Refined By Electricity - - 51
Tiny Automatic Clutch Saves Gas - 51
Hose Mixes Cement; Sprays It On Dome - 54
Typewriter Has 200 Type Styles - - 54
Girls Dance On Stage Ceiling - - - 58
Razor Flips Open For Cleaning - - 58
Center Pivoted Doors Swing Inward - 60
Rigid Roller Irons Roads Smooth - - 64
Boat Motor Has Aluminum Pistons - 64
Spine Harness Eliminates Plaster Cast - 64
Tiny Motor Driven By Sun's Rays - 66
Auto Has Separate Wheel Drive - - 66
Machine Stimulates Hair Growth - 66
Slot Machine Vends 25 Cent Sunburns - 67
Air Mail Pickup Catapults Mail Bags - 67
Steam-Propelled Bus To Appear Soon - 71
Radiator Heat Animates New Toy - 72
New Board Flashes Bridge Game To Fans - 72
Pickup Tool Grasps, Inserts Bolts - - 73
Machine Makes Instant Ice Cream - - 73
Cigarette Maker Fits Vest Pocket - - 78
Razor Edged Tool Cuts Carton Tops - 78
Player Piano Roll Controls Sky Sign - 80
Tiny Ford Has Ten Horsepower - - 80
Build Big Grinder For Telescope - - 81
Camp Stove Has Barbecue Spit - - 81
New Reflector Aids Shaving - - - 82
Double Goggles Work on Hinges - - 82
Pocket Mirror Has Folding Stand - - 86
Revolving Lamp Shades Fit Tiny Bulbs - 86
Rubber Lamp Cord Zips Open - - - 86
Truck Pushes Street Sweeper - - - 88
Movie Camera Is Also Projector - - 88
Cathode Ray Tubes Used In Advertising - 88

INTERESTING SCIENTIFIC ITEMS

Craftsman Makes Gold Phones For Living - 39
Swiss Carve Man's Head In Snow - - 39
Scientist Fakes Voice On Sound Film - - 47
Ford Adopts New Decimal System - - 54
Daredevil Rides Cycle On Handlebar Frame 54
Carbon Dioxide Line Carries Pure Gas - 58
New Gas Puts Victims To Sleep - - - 58
Pal Enjoys Rides On Bike Sled - - - 60
Street Cars Get Sunshine Roofs - - - 60
Man Made Abrasive Rivals Diamond - - 66
New York Has Streamlined Taxis - - - 67
Spanish Use Skyscraper Cemeteries - - 71
Man Rides Inside Mast Of Steamer - - 72
Fish Leap To Eat From Man's Hand - - 73
Pipe Line Carries Bulk Cement - - - 78
Students Get Coffee From Bananas - - 78
Asbestos Blankets Smother Auto Blaze - 81
Gunboats To Fight Shark Menace - - - 81
Miners Hold Rock Drilling Contest - - 82
New Device Helps Piano Tuners - - - 82
Land Boat Carries Out Sailing Maneuvers - 86

FOR THE WORKSHOP FAN

Use Auto Dash Panel As Speaker Baffle - 91
Neon Lamp Acts As Station Finder - - 91
Shield Leads With Wire Springs - - - 91
Matching Wits With Match Tricks - - 93
Handikinks For Home Workshops - - - 96
Auto Shock Absorbers Make Rowing Machine - - - - - - - - 97
Useful Suggestions For Motorists - - - 98
Make Shop Power Tools From Old Auto Parts - - - - - - - - - 99
Stunts With Electricity - - - - - 104
Paste Etches Initials In Glassware - - - 105
Making Third Dimension Spectacles - - 106
Tinting Photo Prints With Dyes - - - 106
Mould Stamps With Wood Filler - - - 106
Flood Lights Built With Little Cost - - 106
See Moon And Planets With $5 Telescope - 107
Kinks For The Home Handyman - - - 111
How To Buy And Use Screws - - - - 112
Indirect Lighting For Ships Models - - 113
Construct A Simple Shocking Machine - - 113

DEPARTMENTS

Solving Reader's Problems - - - - - 10
Random Chips From The Editor's Workbench 18
Home Improvements For The Housewife - 50
Sportsmen's Campfire - - - - - - - 74
Needed Inventions - - - - - - - - 87
Radio Sparks - - - - - - - - - - 89
With The Collectors - - - - - - - - 114
Industry Profits With New Ideas - - - 146

William J. Kostka
Editor

A. Neely Hall
Workshop Expert

Published monthly by Modern Mechanix Publishing Co., 529 So. 7th St., Minneapolis, Minn., U.S.A. Not responsible for unsolicited manuscripts. Contributions accompanied by insufficient postage will not be returned. Entered as Second Class matter Sept. 26, 1928, at Minneapolis, Minn. Application for entry as Second Class matter at Louisville, Ky., pending. Copyright 1935. Advertising offices: Chicago, 360 North Michigan Ave.; New York, 52 Vanderbilt Ave. 15 cents a copy; $1.50 a year in U. S. and Possessions. In Canada, 20c a copy; $2.25 a year. Other Postal Unions, $2.00 a year. Printed in U.S.A.

Robert Page Lincoln
Hunting and Fishing Editor

S. S. Rabl
Naval Architect

Be Popular! BECOME AN EXPERT HARMONICA PLAYER FREE

Jack did, and now he is invited to all the parties . . . .

IT'S NICE to be popular with your friends—to be invited to all the parties—in on all the good times! Well, that is what happens if you are a good harmonica player.

Thousands of boys and girls all over the country have found the Harmonica a short cut to popularity. At school or at play, at parties or meetings, the harmonica player is the center of a group of swaying, singing boys and girls. Thousands of schools have harmonica bands. If you haven't one in your school, why don't you suggest it to your teacher?

Easy to Learn

Without costing you a cent you can learn to play the Harmonica like a professional in a short time. Mail the coupon below for free Illustrated Instruction Book "The Art of Playing the Harmonica."

You don't have to know one note from another. This book tells and *shows* you just what to do. Just follow the simple instructions and in a short time you'll be amazing your friends with the way you can perform.

A lot of big boys love the Harmonica too. Here's what Dizzy Dean the famous St. Louis pitcher says. "Is I play a Harmonica? You bet I do. I've played a Hohner Marine Band for years and it's a winner."

Be Sure That Your Harmonica Is a Hohner

Boys and Girls that buy a Hohner, always have the satisfaction of knowing that they have the finest harmonica that can be obtained. For seventy-five years Hohner Harmonicas have been recognized as the "world's best." True and rich in tone, accurate in pitch, perfect in quality and workmanship Hohner Harmonicas have always been the choice of professional players everywhere for their stage and radio work.

Every Hohner Harmonica has the name "Hohner" on the instrument and on the box. Protect yourself—look for the Hohner name. If the name is not there—it's not a Hohner—accept no substitute.

Send for FREE Instruction Book—See How Easy It Is To Play

We want every boy and girl to know how quickly and easily they can learn to play a Hohner Harmonica. So we would like to send you, absolutely free and without any obligation to you, our complete Instruction Book "The Art of Playing the Harmonica." Just fill in and mail the coupon, and it will be sent you at once.

M. Hohner, Inc., 351 Fourth Ave. New York City

FREE

ILLUSTRATED HARMONICA INSTRUCTION BOOK

M. HOHNER, Inc., Dept. 973-C
351 Fourth Ave., N. Y. City

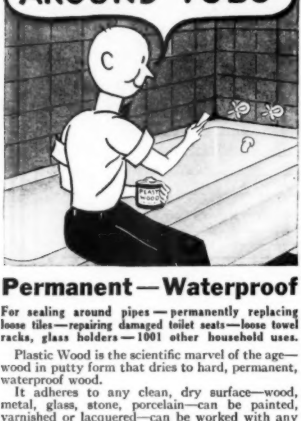
Please send me without cost your Free Instruction Book "The Art of Playing the Harmonica."

Name .....
Please Print

Address .....

City .....State .....

WOOD IN CANS SEALS CRACKS AROUND TUBS



Permanent—Waterproof

For sealing around pipes—permanently replacing loose tiles—repairing damaged toilet seats—loose towel racks, glass holders—1001 other household uses.

Plastic Wood is the scientific marvel of the age—wood in putty form that dries to hard, permanent, waterproof wood.

It adheres to any clean, dry surface—wood, metal, glass, stone, porcelain—can be painted, varnished or lacquered—can be worked with any wood-working tools; can be planed, sawed, sanded, turned on a lathe—will hold screws and nails firmly—will not split or crumble. Get your can or tube at any hardware, paint or department store.

Plastic Wood also comes in white which is ideal for bathroom repairs.

FREE
Write The A. S. Boyle Co., Inc., 1934 Dana Ave., Cincinnati, O., Dept. MM-3 for booklet "200 Things to Do."

PLASTIC WOOD

FUN! BIG PAY EASY for YOU

WITH an easy-playing sweet-toned Buescher you play tunes right away. Be a social "hit," win new friends, popularity, increased income. Opportunities for good-pay jobs. You can qualify quickly.

FREE on trial, any Buescher instrument. Write now for details and handsome Free Book. Mention instrument—saxophone, cornet, trombone, etc.

BUESCHER BAND INSTRUMENT CO.
315 BUESCHER BUILDING
ELKHART INDIANA

REAL JOBS OPEN
For Trained Auto Mechanics

Step Into Big Pay. Earn $35 to $75 a week. I train you in only 8 weeks at largest schools of kind in world. New practical shop plan. Learn with real tools . . . on real equipment. Write today for Big Free Opportunity Book and Special Low Tuition Offer. Address school nearest you.

McSWEENY SCHOOLS, Dept. 11-15 Cleveland, O. or Kansas City, Mo.

FREE BOOK

62 ART LESSONS

Only $1.95 POST PAID

COURSE COMPLETE

Become Talented Artist with Big Income

This thorough home-study Course teaches **Commercial Art, Cartooning, Lettering**—**Poster, Perspective, adv. layout, short cuts, tricks of profession,** etc. By Alexander Murray, famous Art School Instructor. **Natural ability not necessary.** Over 800 clear, concise instruction sheets—easy, step-by-step. Moment, 125 sheets of drawing paper. Private **FREE** Criticism service. Amazing low price. **Only $1.95** postpaid—or send for free details. **Money back** if not delighted after inspecting. **Turn your spare time** into big, steady income tomorrow.

EDUCATIONAL SUPPLY CO. Dept. 111-B RACINE, WIS.

RADIO ENGINEERING,

broadcasting, aviation and police radio, servicing, marine radio telegraphy and telephony, Morse telegraphy and railway accounting taught thoroughly in comprehensive 6 months' duration* equivalent to three years of college radio work. School est. 1874. All expenses low. Catalog free.

DODGE'S INSTITUTE Fern St., Valparaiso, Indiana

*Full bearings completely enclosed. Mounted on special base with automatic spring tension tail-stop for belt drive, flat or "V". Equipped with 1-2" Diam. shaft extension. Requires 1-2 to 3-4 H. P. Wound for 6 V. D. C. excitation from battery or auto generator. Workmanship and materials guaranteed. Write for details.

10-VOLT 60 CYCLE $17 A. C. GENERATOR

Delivers pure **A. C. Ideal for radio,** light plants. New 200 Watt, 2,000 R. P. M.

EMPIRE ELEC. PROD. CO., Box 265-1-2, Spokane, Washington

METALLASCOPE

Patent Pending

FINDS BURIED TREASURE!

New sensational DeLuxe model, 7 tubes, powerful penetration. High sensitivity. Equipped with both sight meter and phones. Two volumeters and radiation control. Weighs only 22 pounds! ABSOLUTELY GUARANTEED able to detect buried gold, silver, copper, etc.

The finest and most dependable instrument of its kind ever constructed. Users all over the world report finds of valuable mineral ore and buried treasure. *Write for free, interesting booklet.*

"If it is metallic, Metallascope will find it"

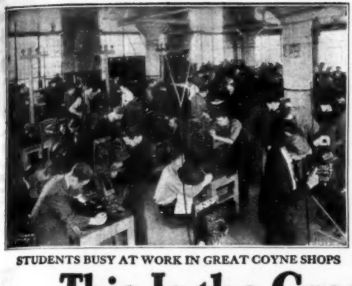
METALLASCOPE SALES CO., 1031 S. Broadway, Dept. M, Los Angeles, Calif.

STOP Your Rupture Worries!

C. E. Brooks, Inventor

Why worry and suffer with that rupture any longer? Learn about my perfected invention. It has brought ease, comfort and happiness to thousands by assisting in relieving and curing many cases of reducible hernia. It has Automatic Air Cushions which **bind and draw the broken parts together as you would a broken limb.** No obnoxious springs or pads. No salves or plasters. Durable, cheap. **Sent on trial** to prove it. Beware of imitations. Never sold in stores nor by agents. Write today for full information sent free in plain, sealed envelope.

H. C. BROOKS 136 State St., Marshall, Michigan



STUDENTS BUSY AT WORK IN GREAT COYNE SHOPS

Learn ELECTRICITY

Pay For Your Training After You Graduate

Yes sir! I mean just what I say. There are no strings to this offer. I'll train you in 90 days, right here in the Great Coyne Shops—NOT BY CORRESPONDENCE—but by real electrical work on real electrical machinery. And you won't have to start paying your tuition until two months after you graduate, and even then you'll have over a year to complete your payments.

This Is the Greatest Offer Ever Made by Any School

THERE are absolutely no conditions attached to this offer. I MEAN EXACTLY WHAT I SAY. You get the full and complete training of the world's oldest and largest Practical Electrical School—AND YOU DON'T START PAYING YOUR TUITION UNTIL 2 MONTHS AFTER YOU GRADUATE! How can I do it? Because I really run no risk. The type of fellow who is ambitious enough to make a little effort to get ahead, is honest, IF YOU ARE AMBITIOUS ENOUGH TO SEND IN THE COUPON TO THIS AD, and then SPEND JUST THREE MONTHS in LEARNING ELECTRICITY, I'LL TRUST YOU for the TUITION.

Learn By Doing In 90 Days

Lack of experience—age or advanced education bars no one. I don't care if you don't know an armature from an air brake—I don't expect you to! It makes no difference! Don't let lack of money stop you. Most of the men at Coyne have no more money than you have. That's why I have worked out my offers.

MANY EARN While LEARNING

If you need part-time work to help pay your living expenses and will tell me your problems I may be able to help you as I have thousands of others. Then, in 12 brief weeks, in the great roaring shops of Coyne, I train you as you never dreamed you could be trained . . . on one of the greatest outlays of electrical apparatus ever assembled . . . real dynamos, engines, power plants, auto, switchboards, transmitting stations . . . everything from doorbells to farm power and lighting . . . full-sized . . . in full operation every day!

TRAINING By Actual Work

No dull books, no baffling charts, no classes, you get individual training . . . all real actual work with only the theory you will need. Rebuilding real batteries . . . winding real armatures, operating real motors, dynamos and generators, wiring houses, etc. That's a glimpse of how we help to make you a master electrician, and fit you to qualify for jobs leading to the biggest pay.

Prepare for Jobs Like These
Here are a few of hundreds of positions in the electrical field. Our free employment bureau gives you a lifetime employment service.
ELECTRICAL EXPERT
SUBSTATION OPERATOR
AUTO ELECTRICIAN
INVENTOR
MAINTENANCE ENGINEER
SERVICE STATION OWNER
RADIO EXPERT

Jobs-Pay-Future

"Two weeks after graduation I received a splendid job. That made consideration given my application was that I was a Coyne Trained man," reports Harold Soucy of Illinois. "I wish to thank your Employment Manager for securing this position for me," writes Albert Yagon, "he sent me out to this Company the first day and I was employed there immediately." And I could go on quoting from hundreds of letters of successful Coyne Trained Men. What they have done, you should be able to do!

Electric Refrigeration

Right now I'm including my big new Electric Refrigeration course at no extra cost.

GET THE FACTS

Coyne is your one greatest chance in life to get into electricity. Every obstacle is removed. This school is 36 years old—Coyne training is tested—proven beyond all doubt—endorsed by many large electrical companies. You can find out everything absolutely free. Simply mail the coupon and let me send you the big, free Coyne book of 150 photographs . . . facts . . . jobs . . . salaries . . . opportunities. Tells you how many earn expenses while training and how we assist our graduates in the field. This does not obligate you. So act at once. Just mail coupon.

Get This FREE Book

Now In Our New Home

This is our new fireproof modern home wherein is installed thousands of dollars' worth of Electrical equipment of all kinds. Every comfort and convenience has been arranged to make you happy and contented during your training.

COYNE H. C. LEWIS, PRESIDENT **ELECTRICAL SCHOOL** FOUNDED 1899
500 S. Paulina St., Dept. 35-53, Chicago

H. C. LEWIS, President
Coyne Electrical School, Dept. 35-53
500 S. Paulina St., Chicago, Ill.

Dear Mr. Lewis:—Without obligation send me your big free catalog and all details of Free Employment Service and your new Electric Refrigeration course, also tell me all about your "Pay After Graduation Offer."

Name.....

Address.....

City..... State.....

BE A RADIO EXPERT

MANY JOBS I'll train you

Broadcasting Stations
Employ managers, engineers, operators, installation and maintenance men for jobs paying up to $5,000 a year.

Loud Speaker Apparatus
Installation and service work is another growing, money-making field for trained Radio men.

"J. E. SMITH
President National Radio Institute
The man who has directed the Home Study Training of more men for the Radio industry than any other man in America.

Set Servicing
Spare time and servicing pays many N. R. I. men $5, $10, $15 a week extra. Full time men make as much as $40, $60, $75 a week.

If you are dissatisfied with your present job—if you are struggling along in a rut with little or no prospect of anything better than a skimpy pay envelope—**Clip and Mail the Coupon NOW!** Get my big 64-page FREE BOOK on the opportunities in Radio. Read how quickly you can learn at home in your spare time to be a Radio Expert—what good jobs my graduates have been getting—real jobs with real futures.

Real Opportunities Ahead in Radio for Trained Men

It's hard to find a field with more opportunities awaiting the trained man. Why in 1933—one of the worst depression years—the Radio industry sold $213,000,000 worth of sets and parts! Radio set sales INCREASED 45%—tube sales INCREASED 25%! Over 300,000 people worked in the industry! It's a gigantic business, even in the worst business years. And look what's ahead! Millions of sets are going out of date annually. 18,000,000 sets are now in operation on which over $200,000,000 are spent EACH YEAR for repairs, servicing, new tubes, etc. Broadcasting stations pay their entertainers (exclusive of artists) approximately $23,000,000 a year. Advertisers pay 600 great Broadcasting Stations over $75,000,000 a year for Radio time and talent. A few hundred jobs that paid $40, $60, $75 a week 20 years ago have grown to thousands. These figures are so big that they're hard to grasp. Yet they're all TRUE! Here's a new industry that has grown to be a commercial giant. No wonder great business leaders predict a brilliant future for the great and growing Radio industry.

SAMPLE LESSON FREE

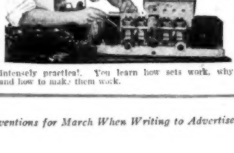
Take advantage of this offer. Mail the coupon *Right Now*, and I'll send you *FREE* a Sample Lesson that only my students have received in the past. This fascinating book, "A Hird's-Eye View of Radio," is just packed and jammed with information about this growing industry. The reason I am willing to send it to you is to PROVE that my Course is simple, easy to understand, and enjoyable to study. I want to SHOW YOU that I can train you, just as I have ALREADY trained thousands of men. Many of them with not even a grammar school education, and no Radio or technical experience, have become Radio experts, and now earn two or three times their former pay. Mail the coupon NOW.

Some Other Jobs N.R.I. Trains Men For

- Radio Service Business of your own
- Spare time Radio Service work
- Retail Sales of Radio Sets and Equipment
- Service Expert for Retail Stores
- Broadcasting Station Operator
- Aircraft Radio Operator
- Ship Radio Operator
- Loud Speaker Systems, Installation and Service
- Auto-Radio Installation and Service
- Television Station Operator
- Commercial Radio Station Operator

You Get PRACTICAL EXPERIENCE with RADIO EQUIPMENT

I GIVE YOU



I'll show you how to use my special Radio Equipment for conducting experiments and building circuits used in well-known sets as Westinghouse, General Electric, Philco, R. C. A.-Victor, Majestic and others. You work out with your own hands many of the things you read in our lesson books. This 50-50 method of training makes learning at home easy, interesting, fascinating, intensely practical. You learn how sets work, why they work and how to make them work.

RADIO EXPERT

MAKE $40 $60 $75 A WEEK

at home • Mail coupon for FREE PROOF

Get Into This Field With a Future

There's opportunity for you in Radio. Its future is certain. Television, short wave, police Radio, automobile Radio, loud speaker systems, aviation Radio, marine Radio—in every branch developments and improvements are taking place. Here is a real future for additional thousands of trained men who really know Radio. Get the Training that opens the road to good pay and success! Send me the Coupon NOW—and get full particulars on how easy and interesting I make learning at home. Read the letters from graduates who are today earning real money in this fascinating industry.

Learn At Home In Your Spare Time To Be a Radio Expert

Hold your job. There is no need for you to give home. I will train you quickly and prosperously in your spare time. You don't have to be a high school or college graduate. My Course is written in a clear, interesting style that most anyone can learn. I give you practical experience under my 50-50 method of Training—one half from Lesson Books and one half from practical experience with equipment I give you. This unique and unequalled method has been called one of the greatest developments in home study Radio training.

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

My big 64-page book gives proof that many make $5, $10, $15 a week extra servicing sets in their spare time soon after enrolling. I give you plans and ideas that have made good spare time money—$200 to $1,000 a year—for hundreds of fellows. My Course is famous as "the one that pays for itself."

Money Back If Not Satisfied

I am so sure that N. R. I. can train you at home satisfactorily that I will agree in writing to refund every penny of your tuition if you are not satisfied with my Lesson and Instruction Service upon completing your Course. You'll get a copy of this agreement with my Book.

64-Page Book of Information Free

Get your copy TODAY. It's free to any ambitious fellow over 15 years old. It tells you about Radio's spare time and full time job opportunities; it tells you about my Course; what others who have taken it are doing and making. Find out what Radio OFFERS YOU without the slightest obligation. MAIL THE COUPON in an envelope, or paste it on a penny postcard NOW.

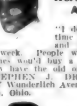
J. E. SMITH, President
NATIONAL RADIO INSTITUTE
Dept. 5CH, Washington, D. C.

Clears $4,500 In 18 Months

"Before taking your Radio Course I was making $18 a week. I came here three years ago. In about 18 months I made about $4,500 in Radio. I cannot say too much for the wonderful help I have received from N. R. I."—NOEL W. RAY, 619 Broad St., Gadsden, Alabama.

Spare Time Work Pays $18 A Week

"I do only spare time Radio work and average $18 a week. People who in good times would buy a new Radio, now have the old one fixed."—STEPHEN J. DRAPCHAY, 407 Wunderlich Avenue, Barberton, Ohio.



Now Owns Own Business

"If I had not taken your Course I would be digging ditches instead of running my own business. One week I made $75 on repairing alone, and this doesn't count sales. If a fellow wants to get into Radio, N. R. I. is the natural point."—R. S. LEWIS, Modern Radio Service, Pittsfield, Ohio.

Mail Now for FREE 64 Page Book

J. E. SMITH, President
National Radio Institute, Dept. 5CH
Washington, D. C.

Dear Mr. Smith: Without obligation send me the Sample Lesson and your free book about spare time and full time Radio opportunities, and how I can train for them at home in spare time.
(Please print plainly)

NAME ..... AGE.....

ADDRESS .....

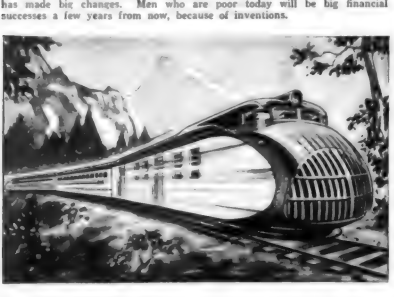
CITY ..... STATE.....

The Books Opposite Contain 68 PAGES OF FACTS FOR

HAVE you an invention—or an idea for one—that will save time, save labor, make money or give pleasure? If you have, **these interesting, new FREE BOOKS were meant for you.** They're crammed full of practical, useful information that the man with an invention needs to know. Tell you facts like these: How the Patent Laws protect you and why, if you have an invention, you need a Patent at all; what a competent Patent Attorney can do for you; what kind of a sketch or model is needed; how to make a disclosure of your idea right away, to help establish your claims; **how some successful inventors have secured financial assistance;** about interesting inventions that have proved successful, and show you **115 different mechanical principles that inventors have used in working out ideas;** also give much other information that every man who has an invention—large or small—can use to his advantage and profit. Read what the inventors below say. Then, if you have an invention yourself—even though it is still in the rough or crude stages—write us. **Our business is to help you if we possibly can. You'll welcome these books of facts.**

The Big Age of Invention Is Still Ahead

Below is one of our newest trains. It's the crack, streamlined express of the Union Pacific. Does 110 miles an hour. The whole train weighs only as much as a single, modern steel pullman car. This is only a glimpse of what's ahead. Experts say that within the next ten years the railroads will have to be revolutionized. Henry Ford says that we're still living in the stage coach age. C. F. Kettering, Vice President of General Motors, says: "We're only entering the great period of inventive advancement." Ten years from now, you'll see a different world; a world in which the inventor has made big changes. Men who are poor today will be big financial successes a few years from now, because of inventions.



Many Little Ideas Have Big Commercial Possibilities

In contrast to the train below, a big development, look at this recent invention, which is so simple that the average person is prompted to say: "Now, why didn't I think of that myself?" This invention is nothing more than a little metal strip, curved to fit partially around the neck and under the cap of an ordinary ginger ale or beer bottle. When pulled out at the bottom, it forces off the cap, rendering a bottle opener unnecessary. A worth while improvement and the inventor has a patent. An invention needn't be complicated to be valuable. **Your first step, if you have an invention, is to get the facts about Patent Protection. We'll gladly supply them FREE to serious, interested men.**

WHAT INVENTORS SAY:

One inventor writes: "I want to compliment you on the publication of a book so replete with information naturally of great interest to inventors."

Another writes: "Your book sure is a wonderful guide for an inventor. I shall keep together the book and all references to have same on hand."

Still another man says: "I have read your book Patent Protection thoroughly and I feel sure that whenever the need of information arises I will know how to proceed in order to patent any device that I may happen to think of."

INVENTORS

This Is a NEW BOOK About SELLING INVENTIONS

Suggestions on WHEN and HOW to Sell an INVENTION

PATENT PROTECTION
A BOOK FOR INVENTORS

There are two sides to every inventive success: There is the inventive side, and the commercial side. A good invention, poorly handled, can prove a failure commercially. An ordinary invention, properly handled, can be made a money-maker. In this NEW booklet we give you "Suggestions on When and How to Sell an Invention." We give you practical hints and advice on the commercial side of inventing. Write us a card, letter or use the handy coupon.

IMPORTANT

With the books, we will also send you a FREE copy of our "Evidence of Invention" form, on which you can make a sketch and description of your invention and establish a confidential date of disclosure. This may later prove important to you. **Any letters, sketches, drawings or models you send us are held in strictest secrecy by us. You can write us frankly and confidentially.**

Your Copies are FREE

Many illustrations and examples taken from inventive history make these real guide books for inventors. If you have an invention, these books may be the means of saving time, expense, even later disappointment. We'll gladly send you copies with our compliments.

WRITE to VICTOR J. EVANS & Co.

36 Years of Service

This firm was founded over a third of a century ago. We have helped thousands of inventors protect their rights. We represent you personally before the U. S. Patent Office. We have a large staff of Patent Specialists to serve you quickly, economically, effectively. Our book also tells you about a three-payment fee plan that many inventors have found helpful. Write us a card, letter or send in the convenient coupon. Decide NOW to know the facts. Do that today.

Registered Patent and Trademark Attorneys
Main Office: 520-C, Victor Building, Washington, D. C.

Other Offices: 1640-B Conway Bldg., Chicago; 1007 B Woolworth Bldg., New York; 514 B Empire Bldg., Pittsburgh; 1010-B Hobart Bldg., San Francisco; 736-B Security Bldg., Los Angeles.

Kindly send me a FREE copy of your book, "Patent Protection" and your special booklet of "Suggestions on When and How to Sell an Invention." (Note: You can also secure the books by writing any of the branch offices listed above.)

Name .....

Street and No. .....

City or Town ..... State .....

Accept this Sensational

10 Day Trial Offer

FREE Mail coupon for details

.... Send No Money

Genuine Brand-NEW

ROYAL PORTABLES

For the first time, you may obtain a genuine, new, latest model Royal Portable on 10 days free trial.

Lowest Prices and Monthly Terms

Unusual new sales plan places amazing convenience of the Royal Portable easily within reach of readers of this magazine. Try a Royal Portable at no expense to you. Even if you have never typed, you can use one *instantly*. If not pleased in every way, it may be returned without question.

Learn Touch Typing Royal's "Simple System of Touch Typewriting," prepared by expert instructors, will enable you to acquire professional typing speed and facility in spare time at home. "Astonishingly quick results."

This is Your Opportunity

FREE Typing Course . . . CARRYING CASE included in This Offer

Business and Professional Men and Women, Students, Teachers, Parents! Be sure to sign and mail the coupon. This entails no obligation. Remember — Royals are the finest of portables — made and fully guaranteed by the world's largest organization devoted exclusively to the production of typewriters. Smooth, rhythmic action of an office typewriter. Will last a lifetime.

Act at once! Offer not guaranteed after March 15th

Royal Typewriter Company, Inc., Dept. M-3
2 Park Avenue, New York City

Please send me complete information concerning Royal's special new sales plan on latest model Royal Portable Typewriters with details of 10-DAY TRIAL OFFER FREE.

NAME.....

STREET.....

CITY.....STATE.....

for Success in AVIATION

You Need LINCOLN Training

LINCOLN'S unexcelled training puts you a step ahead toward success in Aviation. This *Government Approved School* is recognized for graduating Pilots and Mechanics equipped to fill the better, big pay jobs in Aviation. Our recent employment report lists *10 more* LINCOLN graduates who have found good jobs with prominent aviation concerns.

Modern Equipment—Finest Training—Primary and advanced flying taught; includes night flying, blind flying, acrobatics, cross country flying, etc. Master Airplane and Engine Mechanics course prepares you for mechanic's position. High wing, low wing monoplanes, biplanes, open cockpit and cabin transport ships are used to assure you complete experience.

26 Years' Success as mechanics' trade school! 14 years' success teaching aviation. WRITE NOW! State your age.

LINCOLN AIRPLANE & FLYING SCHOOL, 4050 Aircraft Bldg., Lincoln, Nebr.

New DIESEL *Engines!*

DON'T WAIT! Diesel Power is the big, new field for greater opportunities and bigger pay. GET OUT OF THE RUT! BE AN EXPERT DIESEL ENGINEER and advance with this great new industry that is sweeping the world.

LEARN DIESELS in our big, nationally recommended DIESEL Schools and Shops. The original, exclusive DIESEL Schools of the United States and Canada . . . established many years and always ahead in training and equipment. More engines . . . more successful graduates . . . more Big Pay Jobs.

Send for your FREE copy of "Diesel News," containing up-to-the-minute information about the amazing opportunities everywhere for trained DIESEL men.

Book K Explains All Practical School Courses—Day and Night. Book H Explains Home-Study Combination Course.

HEMPHILL DIESEL ENGINEERING SCHOOLS, INC.

2120 San Fernando Road, Los Angeles, Calif.
1253 Diversey Parkway, Chicago, Ill. 500 Wellesley St., Seattle, Wash.
1365 Granville St., Vancouver, B. C.

Nation-wide Employment Service is Free to all Hemphill Graduates

EARN BIG MONEY AT HOME!

Raise mushrooms in your basement, cellar, barn, garage, idle places. Large companies require tons of mushrooms daily for Mushroom Soup. Become an M.G.A. Grower and cash in on this big demand. No experience necessary. We buy crop. FREE BOOK.

MUSHROOM GROWERS OF AMERICA
GE-433 N. Clark St. Chicago, Illinois

MEN—MAKE MONEY

Get into something for yourself, where your income is practically unlimited—The American Electric method of floor surfacing gives you that opportunity. Large profits—Work easy to get—Small amount starts you—Write quick—No obligation.

THE AMERICAN FLOOR SURFACING MACHINE CO.
536 So. St. Clair St. Toledo, Ohio

Learn Public Speaking

At home—in spare time—20 minutes a day. Overcome stage fright, gain self-confidence, increase your personality. Big success in your sphere by effective speech. Write today for free booklet, *How to Work Wonders With Words*.

BOOTH AMERICAN INSTITUTE, Dept. 2083
3601 Michigan Avenue Chicago, Illinois

AUTOMATIC GAS LIGHTER

GREEN WOOD HANDLES, BRASS HOOKS.

450% Profit. We pay F. P. Charges $9.00 12 DOZEN. Rush Name and Address for Sample, 1c. $9.00—12 Doz. Net Profit. $37.00

FREE SPECIAL—Retails 25c 3 Doz. Spiral Lighters with Each Gross

WRITE TODAY.

NEW METHOD MFG. CO. Desk MG-27 Bradford, Pa.

Photography for PLEASURE or PROFIT

A fascinating hobby or a profitable business can now be yours. Prepare quickly at home under the personal guidance of leading experts in the field of photography. No experience necessary. Full or spare time. Many earn while learning. Our thorough studio method also qualifies you to fill a well paying position upon graduation. Send coupon now for FREE booklet, *Opportunities in Modern Photography*.

AMERICAN SCHOOL OF PHOTOGRAPHY
3601 Michigan Avenue Dept. 2083 Chicago, Ill.

Send FREE booklet, *Opportunities in Modern Photography*, and full information.

Name.....

Address.....

City.....State.....

A True **SUCCESS STORY** *by an* **R·T·I TRAINED MAN**

"It was through R-T-I Training that I got the job I now have as Radio Expert for the Oklahoma City Police and Fire Departments. The Course has been of great benefit to me in the practical work that I am doing, and a raise in salary has made me more enthusiastic than before.

"In addition to this, I have made about $200 doing spare time radio work since I enrolled. At present, although I am very busy with my police work, I am able to make from $5 to $8 a week extra in this way."

J. F. BEGGS,
428 West California Ave.,
Oklahoma City, Okla.

HE CLIPPED THE R-T-I COUPON WHY DON'T YOU?

Could you use an EXTRA $200 TOO?

THEN GET INTO RADIO!

WHERE MANY MEN I HAVE TRAINED ARE MAKING

$35 TO $75 A WEEK

My big FREE Book tells you how. Mail the coupon now. This book has shown hundreds of fellows how to quickly make more money and win success.

Shows How I Train You At Home In Your Spare Time For A Good-Pay Radio Job

Why struggle along in a small-pay, no-future job? Get into Radio—the field with a future. I'll train you at home, in your spare time. Keep your present job and income while training. What's more, I'll show you how to earn extra money in your spare time during your Training period.

Many Make $5 to $20 a Week Extra in Spare Time . . . While Learning

That's what many of my students do soon after enrolling. Delmer Grote, Greenville, Ohio, wrote: "Made my first spare-time money six weeks after enrolling. Earned over $500 on spare-time work in ten months while studying."

Radio is Full of Real Opportunities for Trained Men

But only "trained" men can qualify. R-T-I Training fits you for Radio's glorious opportunities—to service sets—to hold a good-pay job in broadcasting, aviation, television, police Radio and many other fields rich in opportunities.

Learn Radio from Real Radio Engineers

R-T-I Training is practical—proven. Famous Radio engineers, working right in the heart of the Radio industry, direct and supervise it. You get the help and advice of these famous men. You get Radio Equipment these engineers selected and approved for conducting experiments and making tests that teach you the practical side of Radio.

Five Advanced Courses, Without Extra Cost

I help you specialize for Radio's biggest jobs—and don't charge you a penny extra for the advanced training. I give you extra—FIVE Advanced Courses that are being sold right now for $20.00 each. These take you into the latest developments of Television, Sound Pictures, Photo Cells and Public Address systems.

My FREE Book Gives You All The Facts

Tells about Radio's spare-time and full-time opportunities. About my hundreds of successful students. About my employment department. About my Money Back Agreement. About my Four Big Outfits of Radio Equipment furnished without extra cost. Clip and mail the coupon *now*. Learn how you can get into a field with a real future. Learn why 45 big radio manufacturers endorse and recommend R-T-I Training . . . how the famous R-T-I Advisory Board works for you and with you while studying and after graduation.

RAY D. SMITH,
President
RADIO & TELEVISION INSTITUTE
Chicago

R-T-I'S Famous Advisory Board of Nationally Known Radio Engineers and Executives

Dr. C. M. Blackburn
Chief Radio Engineer
Bassett-Warner Corporation.

Kendall Clough
Chief Engineer, Clough-Brengle Co. (Radio Engineers and Manufacturers)

Karl Hassel
Chief Engineer
Zenith Radio Corporation.

Homer Hogan
General Manager
Radio Station
KYW, Chicago.

E. E. Gramer
Chief Engineer
Standard Transformer Corp.

F. D. Whitten
Service Manager
Chicago Plant
Philco Radio and Television Corporation.

MAIL COUPON FOR FREE BOOK

RAY D. SMITH, President,
Radio & Television Institute (R-T-I)
2130 Lawrence Ave., Dept. 33
Chicago, Ill.

Dear Mr. Smith: Without obligating me, send your book which points out the spare time and full time job opportunities in Radio and describes your Industry Endorsed method of training men at home in spare time to become Radio Experts.

Name .....

Address ..... Age .....

City ..... State .....

1935 MODEL ATLAS "UNIT PLAN"

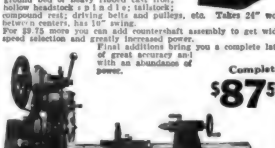
Metal-Working Lathe

designed so units may be added

Here's a lathe that meets every need economically. As your shop grows you can add to it, UNIT by UNIT, until you have a fully equipped, back-geared, screw-cutting lathe, capable of every kind of lathe work—as fine a tool as a man could wish for.

First step $39.50

This first step, $39.50, has precision-ground bed of heavy ribbed cast iron; hollow headstock; spindle; tailstock; compound rest; driving belts and pulleys, etc. Takes 24" work between centers, has 10" swing. For $9.75 more you can add countershaft assembly to get wider speed selection and greatly increased power.



Final additions bring you a complete lathe of great accuracy and with an abundance of power.

Complete $87.50

Back-geared; screw-cutting; automatic, reversible feeds. Sixteen speeds from 20 to 2,073 R. P. M. Cuts 4 to 72 threads per inch. Will do ANY job within its capacity accurately and easily. TWO WEEKS' TRIAL, money-back guarantee. Easy terms. Full line of attachments at reduced prices.

ATLAS PRESS COMPANY

1852 N. PITCHER ST.— KALAMAZOO, MICH.

ATLAS DRILL PRESSES $13.95 to $33.45

FREE Catalog

Please send catalog of ATLAS metal and wood lathes; drill presses; attachments; arbor presses.

NAME .....

ADDRESS .....

CITY ..... STATE .....

NEW LIFETIME BUSINESS

NO HOUSE-TO-HOUSE CANVASSING

FOUR $15 SALES DAILY .. PAY $280 WEEKLY..

Installing new business specialty on FREE TRIAL. Fergus, Georgia, makes over 1,000 sales netting him $3 to $60 profit each sale. Foyer makes $4,920 big profit in three months. Pegram makes $315 his first 6 days. Enormous profits for high grade men installing new business specialty on FREE trial. $4,760 gross in one month for thoroughly reliable man. $4,787 gross in 3 months for man with no references from our $80,50 investment. Install without a dollar down. Producers live cash to pay for it—sell before payment due. World's largest firms among our customers. Smallest business or office buyer. Customer guaranteed cash saving 10 times price paid. We furnish no portfolio of reference lettering from furniture concerns. Closes the deal. Exclusive. Representatives wanted—try this business without risking a cent of your own money. We train you. Write today for full information.

F. E. ARMSTRONG Dept. 2019-C Mobile, Ala.

SHOES LIKE NEW

As Low As **2c A Pair**

PAYS YOU UP TO $2.00 AN HOUR

SAV-AN-UPPER—Sensational new discovery—completely covers scuffed, discolored and faded uppers of any shoes with wear-proof, high polished coating. Makes them look new. Quick, easy, economical. Takes only a minute. Guaranteed.

JUST BRUSH IT ON! Also tasty new and different Silver, ginger, gold-looking long-wearing, crack proof finish to shoes and leather articles.

FREE SAMPLE—Men and women representatives making tremendous profits up to $30 per week. Unlimited demand. Many former families also earned $2.50 by a busy Co. A. Lawrence, Kan., took 99 orders in 5 hours. Write today for free sample offer and valuable money making proposition. Send no money. Opportunity For Distributors In Foreign Countries.

Not a Polish Not a Dye

SAV-AN-UPPER CO.

Dept. S-223 Cincinnati, Ohio

FOR GENERAL USE

The Ideal Utility Glass

$1.45 & $2.45 plus 15c postage

A Magnifier of Great Power, convenient and highly efficient instrument for the shop, office, home and school. Mounted on a rich black stippled base, with nickeled arms, and socket joints give any position desired. In attractive hinged wood case; 1⅛ in. diameter, plano convex lens, $1.45; 1¾ in. diameter, achromatic lens $2.45. **FREE**—Catalog Hunting Equipment, Rifles, Glasses, etc.

HUDSON SPORTING GOODS CO., M-52 Warren St., N. Y.

LEARN HOW TO USE YOUR VOICE

Learn to be a radio announcer—movie star—a public speaker—a toastmaster, etc.—how to address your group or club—how to improve your voice and thought as a salesman—and more! Amazing new book "VOICE—and how to use it"—exposes professional secrets of storytelling and voicing—complete instruction in one compact volume! Start training now. Earn while learning. Complete course postpaid for only $1.00. Money back if not satisfied. Limited Edition—just off the press. Act at once!

VOICE, Dept. H. 926 Fifth Ave., New York City, N. Y.

Beautiful Chrome Ring or Solid Nickel-Silver Bracelet—your name and address engraved FREE. 50c each, postpaid. Ring also furnished in lifetime STERLING SILVER, ONLY $1.00. All orders filled immediately upon receipt of money order or well wrapped coin. Please give size or measure finger with strip of paper.

P. A. R. COMPANY DEPT. 3-6-M GALVESTON, TEXAS

Be a Draftsman Make BIG PAY

Only 16 minutes a day with these WONDER BOOKS will prepare you for a good drafting job in less than a year. Mechanical and architectural drafting from complete straight lines to highest complex pieces. A step at a time. Built especially for beginners. Not one big, gruesome school thing. Draft on room practice, 3 books, ENGINEERING, Draftsmen's Handbook, complete course in blue-print reading.

That 5 Big **Books** Shipped **FREE!**

Quick Way to Learn

Competent draftsmen are urgently needed right now in all building and manufacturing lines at $5, $6 to $10 a week. That's not the begin. line—FOR DRAFTSMEN HAVE THE BEST CHANCES FOR ADVANCEMENT. Planning, mechanical or building, can be learned quickly with these books. Complete, authoritative, easy to understand. Not a correspondence course. Not a home study course. Not a trade school course.

American Technical Society, Dept. D-3380, Drexel at 58th St., Chicago, Ill.

Send for 10 days' free use Blue Print Reading Set, Drafting Set, Engineering Set, Draftsmen's Handbook, Complete Course in Mechanical Drawing. If I keep them, I will send $2.00 after 10 days, then $2.00 a month until $14.80, the special introductory price, is paid. Send name and address and include drawing instruments.

Name .....

Address .....

Attach letter stating age, occupation, employer's name and address and that of at least one business man as a reference.

Invisible Hands Magically Assure WORLD-WIDE HIGH FIDELITY RECEPTION *with This Amazing New* MIDWEST 16-TUBE ALL-WAVE Radio! (ALL FIVE WAVE BANDS)

THE almost magical performance of this super radio is startlingly human! As domestic and foreign stations are brought in, many automatic adjustments are constantly being made inside the set. It might be said that a number of "Invisible Hands" enable you to bring in and hold any station you desire from the whole world of broadcast ..regardless of fading and interfering conditions. Before you buy any radio, write for the new FREE Midwest "Fifteenth Anniversary" catalog and see how you can save from ½ to ½ by buying direct from Midwest laboratories. Learn why Midwest outperforms sets costing up to $200.00 and more. Now save 30% to 50%. Never before so much radio for so little money! Midwest gives you Triple Insurance with: One-Year Guarantee, Foreign Reception Guarantee, Money-Back Guarantee

ONLY RADIO COVERING 9 TO 2,400 METERS. 12,000 MILE TUNING RANGE

WORLD'S GREATEST RADIO VALUE

$57.50 with New Deluxe Auditorium-Type SPEAKER

TERMS as low as $5.00 down

Only Midwest Offers Multi-Function Dial

This exclusive dial is not an ordinary airplane dial—but a many-purpose unit that performs exclusive functions. Send for FREE miniature dial showing these outstanding advantages:

1. Dial calibrated to Kilocycles, Megacycles and Meters;
2. Call Letters of American Broadcast Stations printed on Dial and Illuminated;
3. Slow-Fast, Smooth-Action Tuning;
4. Station Group Locator;
5. Simplified Tuning Guide Lights;
6. Automatic Select-O-Band Indicator;
7. Illuminated Pointer Indicator;
8. Silent Shadow Tuning;
9. Centralized Tuning.

New Style Consolette

The Midwest 30-page catalog pictures a complete line of beautiful, artistic de luxe consolette and chassis in four colors. Write for new FREE catalog today!

Midwest long-range radios are priced as low as ... $27.50

50 ADVANCED FEATURES

Exclusive "Invisible Hands" features include: High Level Automatic Volume Control Action, Discriminating Automatic Tone Control, Multi-Function Dial, Micro-Tenuator, Fidel-A-Stat, etc. Only Midwest covers a tuning range of 9 to 2400 meters (33 megacycles to 125 KC)—enabling you to easily and successfully tune in even low-powered foreign stations up to 12,000 miles away. All 5 Wave Bands enable you to enjoy today's finest High Fidelity American programs. In addition, you get Canadian, police, amateur, airplane broadcasts ..commercial and ship signals ..and delight in existing world-wide broadcasts from England, France, Germany, Spain, Italy, Russia, Australia, etc. Send today for money-saving facts!

SENSATIONAL HIGH FIDELITY RECEPTION

The bigger, better, more powerful, clearer-toned, super-selective 16-tube "Invisible Hands" radio gives you absolute realism—assures you of lifelike, crystal-clear tone, unlike anything you have ever experienced before. You will hear one more octave—overtones—that cannot be brought in with ordinary radios. Every instrument, every voice, every shade and inflection of speech

Hears His Native Country

Arcadier, Mass.—I tuned in CTIAA, Lisbon, Portugal, my birthplace...clear as a local. Heard news, music and songs of my country. This alone is worth more than low price I paid for my Midwest. Also tuned in GSB, England 12RO, Rome DJA, Germany and many other foreign stations. Anibal N Ferreira.

DEAL DIRECT WITH LABORATORIES

Increasing costs are sure to result in higher radio prices soon. Buy before the big advance! ..NOW.. while you can take advantage of Midwest's sensational values. No middlemen's profits to pay! You can order your Midwest High Fidelity radio from the new Midwest catalog with as much certainty of satisfaction as if you were to select it in our great radio laboratories. You save 30% to 50% when you buy this popular way ..you get 30 days FREE trial..as little as $5.00 down puts a Midwest radio in your home. Foreign Reception, One-Year and Money-Back GUARANTEES protect you! Write for FREE catalog NOW TODAY!

SAVE up to 50%

MAIL COUPON TODAY! for *FREE* MINIATURE DIAL..... *FREE* 30-DAY TRIAL OFFER.. *FREE* CATALOG

MIDWEST RADIO CORP., Dept. 57A, Cincinnati, Ohio.
Without obligation on my part, send me your new FREE 1935-36 catalog, FREE Miniature Dial, and complete details of your liberal 30-day FREE trial offer. This is JUST an order.

User-Agents Make Easy Extra Money. Check Here for Details ☐

Name.....

Address.....

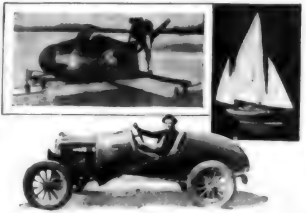
Town.....State.....

☐ Check here if interested in a Midwest Built With Pride Farm Radio. Operates on 6 volts. Write for special literature.

MIDWEST RADIO CORP.
DEPT. 57A — CINCINNATI, OHIO, U. S. A.
Established 1920 Cable Address Miraco. All Codes

Random Chips from

MM steps out in a new roto suit to give its readers a more attractive magazine. And here's the first photo of the I. S. M. M. I. charter being sent to all new clubs.



PRIZE WINNERS. Upper left—the air drive ice sled which does 80 m. p. h. brought first prize to Quentin Mohr. Ford Cooke built the MM speedster body with wood, airplane fabric and dope to take second prize of $3.00. Charles Witthoft's 30-inch model cruising yawl took third prize. It is a scale working model designed for real sailing. Every month the Workbench awards prizes to the three best photos.

DRESSED up in its new suit of rotogravure printing, MODERN MECHANIX AND INVENTIONS scores another outstanding advancement this month. At no increase in price, MM from now on will appear in roto, a more costly process than ordinary printing, but a better, more attractive magazine for its hundreds of thousands of readers.

We are anxious to know just how much you like MM in its new dress. Drop us a card stating your reactions. We'll try to print as many as possible.

* * *

In a letter to the editor William I. Ylimanen of Keeweenaw Bay, Mich., says:

To prove my estimation of MM, I once walked actually 10 miles to get my copy because the local newsstand ran out. Keep up the good work!

Ylimanen, how far will you hike for MM now with its new roto printing and the many big features we have planned for MM?

* * *

Here's a tip to you fellows trying to win prizes in the Workbench contests. We are now planning the early summer issues and the prizes will be going to the summer projects, garden furniture, tractors, boats, auto trailers and the like. Dig through your snapshots for the things you built last summer, if you are not building any summer jobs in your workshop now.

The same applies to readers trying to get $3.00 apiece for handikinks from MM. Remember we plan the magazine three months or more ahead of time. Now is the time to send in fishing, camping, vacation, and gardening kinks.

This month's prize winning pictures are at the top of this page. First prize of $5.00 goes to Quentin A. Mohr for his ice sled. He writes:

Burlington, Wis.

Dear Editor:

Now that the ice season is here we got our old boat out of moth balls the other day and got her all tuned up.

She is powered with a 61 Harley with a special crankshaft. The body framework is wood throughout and covering is of light tin. She is 7 feet long, 24 inches wide. The front runner plank is 7'8" long and the highest part of the body is 34 inches from the ice.

We clocked her with an auto driving along side on the ice. By the car speedometer she was doing 80 and was not open all the way.

Quentin A. Mohr.

Some speed, eh, for an air drive sled?

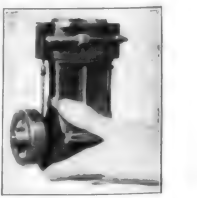
* * *

Ford Cooke walked off with the $3.00 second prize for his photo of an MM speedster body. He says:

Eaton, Colo.

Dear Editor:

I am enclosing a snapshot of the MM speedster body which I built from drawings in the February, 1932, issue of *Modern Mechanix and Inventions*. The framework is built up of wood and covered with air-



This two cylinder double acting steam engine was designed for model builders by Russell Lamoureux of Minneapolis, Minn. It runs on 1 to 200 lbs. of steam.

the Editor's Workbench

plane fabric. Two coats of clear and two coats of yellow pigmented dope were next applied. This covering has stood up very well under extremely hard use.

Ford G. Cooke.

Blueprints for the speedster body are described in MM's blueprint booklet which you can get for a stamped and addressed envelope.

* * *

Charles Wittholz' model boat took third prize of $2.00. Here's what he says:

Buffalo, N. Y.

Dear Editor:

Here is a picture of seven months of fun. The project is a thirty-inch model cruising yawl, constructed as a typical yacht of steam bent frames and planking. She represents my idea of what a coastwise hooker ought to be, that is I designed it after a number of years of on and off study at naval architecture.

As you see she is a scale working model, designed for real sailing. I regret that I can't forward a photo of the miniature cabin which contains everything from the hatch to the floor.

Charles W. Wittholz.

* * *

While we're on the subject of boats—many of you have asked us how to go about changing dimensions on various types of boats. We've always vetoed any suggestions to stray from the designer's original drawings, but we've finally given in. On page 100 Sam Rabl, MM's boat expert, tells you just what to do "When You Change That Boat."

* * *

Walter Raynor has a great time with the hydro towing glider shown in this department. He says:

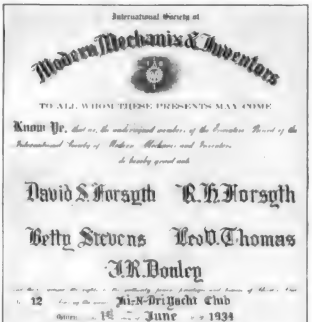
Patchogue, N. Y.

Dear Editor:

I am sending some snaps of a hydro towing glider which I designed and have flown. My glider has been flown by several pilots and they claim it is the best flying hydro glider in the country.

It will take off in a run of less than 100 feet if there is a good breeze blowing. It will take off at a speed of about 20 miles per hour. I

[Continued on page 20]


International Society of
Modern Mechanics & Inventors
TO ALL WHOM THESE PRESENTS MAY COME
Know Ye, that we, the undersigned members of the Executive Board of the International Society of Modern Mechanics and Inventors,
do hereby grant unto
David S. Forsyth R. H. Forsyth
Betty Stevens Fred D. Thomas
J. R. Donley
Hi-N-Dri Yacht Club
June 1934

Here is a greatly reduced photo of the charter of the International Society of Modern Mechanix and Inventors sent to president of the Hi-N-Dri Yacht Club of Los Angeles, Calif.

"I NEVER HAD SUCH A SMOOTH SHAVE"

says PEPPER MARTIN *praising Probak*

DEAR PEPPER MARTIN: Your good word for Probak it appreciated. And now we'd like to tell you about Probak Junior, the marvelous new double-edge razor blade that combines shaving comfort with an extremely low price. Think of it! 25 keen, smooth-shaving blades, uniform in quality, for only 59¢. Probak Junior is automatically tempered, honed and stropped to produce a shaving edge that removes even the toughest beard swiftly, cleanly and with perfect comfort.

Probak Junior is a product of Gillette and fits all Gillette and Probak razors.

NOW! PROBAK JUNIOR 25 BLADES FOR 59¢

Also trial package of 4 blades for 10c at your dealer

Oilstones
win skating races

HOCKEY PLAYERS and champion speed skaters use India *Oilstones* for taking the burr off newly ground skates. Exhibition rink performers are able to leap, dance and gyrate because they, too, keep their fine steel blades very sharp and true with an *oilstone.*

A famous mechanical engineer once said: "Reputations for skill are made only by workmen who know the fine points about sharpening the tools they use." All fine craftsmen take special pride in fast, easy-cutting hand tools—kept keen with their bench *oilstones.* Drills, reamers and other metal cutting tools need less regrinding and last much longer when *oilstoned.*

A FREE BOOK

"How to Sharpen" is packed with practical facts. It tells why the "India" (electric furnace abrasive), why the rare Arkansas quarried oilstones are used—and how to care for them, too. Thousands of readers have sent for this book.

NORTON PIKE *Products*
Established 1823
Use what Experts use

BEHR-MANNING CORP., *U. S. Sales Representatives*
Dept. G. Troy, N. Y.

Send me free, Norton Pike Book, "How to Sharpen."

Name.....

Address.....

Chips from the Editor's Workbench

[*Continued from page 19*]

Lower photo shows Walter Raynor's hydro glider at the start of a tow. Upper photo shows the hydo glider in the air.

flew it myself and had never had hold of a control stick before.

Walter Raynor.

* * *

The International Society of Modern Mechanix and Inventors continues to grow. Some time ago we sent off engraved charters to all clubs organized to date. And as we were sending out the charters, we discovered we erred in the January issue when we said Mrs. Marguerite Bone of the Y's Craftsmen Club of Washington, D. C., was the first woman member of the society. The honor really belongs to Miss Betty Stevens, whose name appears on the Hi-N-Dri Yacht Club charter.

If you're thinking of joining the society, get five or more men together and organize a club. Then write us for an application blank and special subscription rates for club members.

George Geary of Kingston, Ont., is enthusiastic about this MM Tar Baby he built. He says "she is very steady in choppy water" and is a handy boat for fishing.

Revolutionary
NEW WALL CLEANER
A Gold Mine For AGENTS!

AGENTS! Big Money!
Fast, easy plan. Handy chemical action. Write for free sample offer. Write today for all details.

HERE'S something brand new, needed in every home. Amazing Wall Cleaning Invention banishes old-style housecleaning mess and scrubbing forever. Big money-no stick, no soap, no rag, no powder, no hands. No muss, dangerous step ladders, no dust. Banishes dirt like magic from walls, ceilings, woodwork, furniture, etc. Ends drudgery! Some rediscovering housewives wild about it. Low priced. Lasts for years.

SAMPLE OFFER Complete sample set our risk to first person in each locality who writes. No obligation. Get details. Be first-send your name TODAY!

Nelson Mfg. Co., 2433 Bar St., Akron, O.

CHEAP OIL BURNER Invented
COOKS A MEAL FOR 1c
Burns Into Any Old Stove, Range or Furnace; Heats Cool or Wood; No Dirt or Ashes; HALF THE COST.

United Factories, C-606 Exchange Bldg., Kansas City, Mo., have brought out an amazing oil burner which experts and 15,000 users say beats any ever gotten out. Burns cheap oil a new way, without pump, wire or clockwork; gives intense heat at HALF COST by turn of valve. One free to one person in each locality who will demonstrate and act as agent. Write quick, be first to learn how to end drudgery of coal and wood and make big money, spare or full time—mail it postcard today.

NEW Dual Ray HEALTH LAMP UNIT

ULTRA VIOLET AND INFRA RED RAY IN ONE LAMP
Complete with Quartz Tube
Health giving. Prevents blisters and skin ulcers. Gives Sun-tan—Vitamin D. Automatic safety control. 110 Volt A. C. or DC. Free Details.
$3.50
SEVER-WELL CO.
Dept. B-3, 4655 Lincoln Ave., CHICAGO

Learn Advertising at Home
Make money in advertising. Prepare quickly during spare time. Also earn while you learn. No classroom necessary. Write today for free booklet telling how. Send no money. Pay when position is secured. Big opportunities.
Page-Davis School of Advertising
2560 Michigan Avenue, Dept. 2893, Chicago, Illinois, U. S. A.

For Boat, Auto Racer, Radio Plans
Get Modern Mechanix' 1933 How-to-Build-It
3-HORSE POWER GAS ENGINE Only $17.75

More than 101 uses for this little engine. Large enough to pull dad's machinery, yet not too large for junior's midget car. Weighs 35 lbs. costs less to run than electric motor. Most convenient power for portable or stationary air-compressors, waterpumps, generators, and the home workshop. Gives 45 lbs. thrust with 6"-4" air propeller for sleds, boats, etc. Send 5c for circular.
RASMUSSEN MOTOR COMPANY
Builders of Aircraft Engines
326 Hickory St., Dept. M, Niles, Mich.

GOVT JOBS

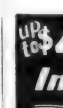
SALARY TO START $105 to $175 MONTHLY
MEN, WOMEN Age Range 18 to 50

( ) Ry. Mail Clerk
( ) P. O. Laborer
( ) R. F. D. Carrier
( ) Special Agent
( ) Customs Inspector
( ) City Mail Carrier
( ) P. O. Clerk
( ) Matron
( ) Immig'n Inspector
( ) Typist
( ) POSTMASTER
( ) Seamstress
( ) Auditor
( ) Stenographer
( ) U.S. Border Patrol
( ) Telephone Opr.
( ) Watchman
( ) Meat Inspector
( ) Statistical Clerk
( ) File Clerk

INSTRUCTION BUREAU, Dept. 233, St. Louis, Mo.
Send me FREE particulars "How to Qualify for [illegible] Positions", marked (X) above. Also list of Customs, opportunities, etc. ALL ABOUT FREE.
Name.....
Address.....

TURN SPARE HOURS INTO CASH!

UP to $40 Weekly In Your Own Home



No soliciting! No canvassing! We show you how to make big money decorating fast-selling Giftwares. We start you with the big $10 Artist's Outfit shown above. We supply you with $150 worth of Giftwares free of extra charge and show you how to dispose of them without leaving your home. We give you 29 Tested Plans for making money. One Fireside Member says, "I made $100 on furniture in one week." Another writes, "My sales were $500 for 5 weeks. This is my first year." B. M. P., of Ill., says, "I did $3.500 worth of business last year and over $15,000 this year." D. W., New Mexico, reports, "I would not take $1000 for my Course."

No Experience Needed
You too may have a guaranteed income completely with Fireside. No tiresome study. You learn by doing. No artistic ability necessary. Our easy 3-Step Method makes the work easy to learn and easy to do and fits you to make good money practically from the start.

Quick Sales in Your Home
No need to leave the house to dispose of everything you make. Our new automatic salesman does all the selling for you. Designed to quickly find cash buyers for all the giftwares you can turn out.

No Cost Plan
Send coupon for details of new plan that pays for your Fireside Course besides putting big cash profits in your pockets. Mail coupon now while openings for new members are still being offered.

FIRESIDE INDUSTRIES
Dept. 142-C
Adrian Mich.

FREE! Book on decorating at home for big money. Tells how to get this beautiful 10-piece Artist Outfit free of extra charge.

Fireside Industries
Dept. 142-C, Adrian, Mich.
Send me FREE Book on Home Decorating for a big steady income. Also details of plan that will pay for my Course and give me big profits besides.

NAME.....
ADDRESS.....
CITY.....STATE.....

"Experience is a great teacher—but you can learn more from books, quicker and cheaper."

And the author of that sentence might have added "AND SAVE YOUR JOB AT THE SAME TIME" if he had thought of a machine shop when he wrote it.

A ruined piece of work these days usually means a lost job. Only good men *have* jobs now, and to *keep* them they must make themselves top-notchers.

You can do a lot toward insuring your own job with the—

American Machinists' Library

6 volumes—2,000 pages—2,500 illustrations
(A combined home-study course and reference library)

HERE is a Library that gives you expert information on every point of your work. It fully explains and illustrates tool and gage work, machine tool operation, jigs and fixtures, punches and dies, the working of steel, operating lathes, drills, hand and automatic screw machines, planers, boring machines, milling machines and a thousand and one other points of information which you need every day.

Solves Your Problems

No matter what the problem is that puzzles you, if it is anything to do with a machine shop you will find it answered in these books. Whether you are a tool maker, a die maker, a draftsman, or handling any job there is in a machine shop, this Library contains the practical information you need.

The text is written in language intended for the practical man. You will recognize it as sound, practical, machine shop talk all the way through.

This is THE Library which will make you feel surer of yourself and of your job. You owe it to yourself and your future to mail the coupon at the bottom of this page AT ONCE.

Free Examination—Easy Monthly Terms

Look over this helpful library for 10 days without obligation. Thousands have used this plan to satisfy themselves. If you decide to keep the books, pay for them as you use them, in easy monthly installments. Fill in and send the Free Examination coupon now.

FREE EXAMINATION COUPON

McGRAW-HILL BOOK CO., Inc., 330 W. 42nd St., New York.
Send me for 10 days' free examination the AMERICAN MACHINISTS' LIBRARY. If I keep it I will send you $1.50 at the end of 10 days and $2.00 monthly until the Special Price of $17.50 has been paid. If not wanted I will return the books postpaid.

Signed .....

Address .....

City and State.....

Position .....

Company MMX-3-35

SCHOOL of the THEATRE

GILMOR BROWN — CHAS. F. PRECHT
DIRECTOR — GENERAL MGR.

Get the facts about this new Technical Course of training in the mechanical and business side of the Theatre. All subjects except acting. Designed to prepare students for positions in any branch of commercial theatre operation. Write General Manager about this new, interesting and well paid profession. Address Dept. M.

PASADENA COMMUNITY PLAYHOUSE
33 S. EL MOLINO AVE. PASADENA, CALIF.

Big 3½ ft. Telescope

5 sections, brass bound, 10-mile range. Study Moon, Stars and distant objects with this powerful 8-x instrument. Special eye piece for viewing Sun included FREE. Makes an ideal Microscope. Guaranteed. Big value. Postpaid $1.75. C. O. D. 15c extra.

BENNER & COMPANY, T-75, TRENTON, N. J.

MAN IN EACH TOWN

To Plate Auto Parts, Reflectors, Bathroom Fixtures, Refinish Beds, Mirrors, Chandeliers, by new method; no capital or experience required. Simple plan of manufacturing at home starts you in big money making business. Outfit furnished. Free particulars and proofs.

GUNMETAL CO. Ave. M Decatur, Ill.

BE TALL

Your Height increased in 14 days or money back! The amazing Stebbing System soon brings 3-5 inches increase, new "pep" and energy. A valuable Health Course and "Success and Popularity" Course included FREE with System, sent complete for $2.00. Send for convincing Free Book with testimonials and Guarantee in plain sealed envelope. WRITE NOW TO:—

STEBBING SYSTEM
Dept. M. M. 12, FOREST HILLS, NEW YORK

PROTRUDING EARS?

A simple modern device sets them in position immediately. Invisible—comfortable—harmless, worn any time by children or adults. Endorsed by physicians and users as the best method for correcting this disfigurement. *Send stamp for free booklet and trial offer.*
AURA LABORATORIES, Dept. 24, 1587 Broadway, New York City

That is what an INVENTOR has to say about New Book

"YOUR INVENTION—WHAT TO DO WITH IT"

6" by 9"; 20 Chapters 35,000 words.

To read it will save and make you money.

$600-SAVED

Don't wait until it is too late. Tells how to Protect, Develop & Sell Your Invention. Send only $1.00 today for your copy. MONEY BACK IF NOT DELIGHTED.

ROESCH & ASSOCIATES, INC.
937 University Block,
Syracuse, N. Y.

EXPERIMENTERS

Electric Fun! Make things spin, jump, shoot, shock, flash, mystify with 110 volts A.C. Book of 200 stunts.....$1.00

Spectroscope: Powerful laboratory instrument, new invention, studies all metals under 5K-watt excitation and shows the countless lines of the solar spectrum.....$2.50

Stroboscope: Complete with 110 volts motor, neon lamp and book of 20 fascinating experiments.....$1.00

The Robot: Directions for staging a spectacular electric show with Tesla and high-tension stunts.....$0.50

Chemical Fun: Book of 160 experiments with simple chemicals; many of them home-made. Magic and mystery.....$0.50

Inventors: Get your own patents. Legal blanks, book of complete instructions and sound advice.....$1.00

Combination Offer: All six of the above items for.....$3.00

CUTTING & SONS 35 D St. Campbell, Calif.

STRING your own RACQUET

Same Quality String As in Expensive Racquets

Outfit Complete with string, tools and directions $1.65

Easy to restring racquets—better than new. Saves real money. Send for this professional outfit today! Good profits made restringing other players' racquets. 27 ft. string, colors, Purple, Green, Red or White—also Scarlet and Black Spiral—with contrasting silk trim and complete easy directions. Money back guarantee.

MARK X MONEY Send check or Money Order $1.65 which includes Postage and Insurance. Send for FREE C.O.D. if desired. (No stamps)

PRO TENNIS STRING CO., Dept. W-5 HARMON, N. Y.

A GOOD PAYING BUSINESS OF YOUR OWN

FREE BOOK

Raise Guinea Pigs for us. No experience necessary. Supply breeders and buy the young, paying up to $2.00 a pr. Use your cellar, spare room or barn. Write today for FREE BOOK.

RESEARCH SUPPLY CORPORATION Dept. W-5 2430 W. York St., Phila., Pa.

EARN UP TO $50 A WEEK

CRIMP DETECTION SECRET SERVICE FORGER FIGHTS

SECRET SERVICE BOOK FREE

Send for 30 Days Reading

No Money Down—Easy Monthly Terms

If You Act Quick—We will send you this startling book on Crime Detection, Secret Service and Identification Work for 30 days free examination. Send no money. If you decide to keep it, then send only $1.00. If not, return it. WRITE today. Book sent to boys under 17 years of age.

T. G. Cooke, Book Dept. 23-53, 1920 Sunnyside Ave., Chicago

Learn to Dance

You can learn all the modern dances—the latest Tango steps, the new Fox Trots, Groovy Waltzes, smart Collegiate Steps, and popular Society Dances at home easily and quickly. New chart method makes dancing as simple as A, B-C. No music or partner required. Don't be a wallflower. Learn to dance. Complete course—Big Book, 64 Illustrations, sent on 5 Days' Free Trial. Costs Under $20.00 course. Send no money. Pay postman only $1.98, plus postage upon arrival. Money back if not delighted. Catalog Free.

Franklin Pub. Co., 860 So. Clark St., Dept. A330, Chicago

FUN!

MAKE THIS Squirrel Lamp

You sir, out of a real squirrel! Also make ash-trays, bookends, etc., using rubber moulds. EARN $5 AN HOUR IN SPARE TIME. Big profits in FUN. Get started at once. Increase your earnings.

It's FUN! BIG profits in spare time!

Free book tells how.

FREE BOOK! Write TODAY for startling free book telling how to learn this fine hobby. Book is free. Contains many fine pictures. STATE YOUR AGE.

R. W. SCHOOL OF TAXIDERMY, Dept. 4733 Omaha, Nebr.

"HE WILL SOON BE A GRADUATE ENGINEER"

"I HAVE been keeping my eye on him ever since he started studying that I. C. S. Engineering Course in his spare time. I agree with you, he's ready for promotion." "I know you agree, we need more men like him in this business."

Will they ever say that about you? The chances are they will if you mail this coupon—then follow through. Do it today.

INTERNATIONAL CORRESPONDENCE SCHOOLS

"The Universal University" Box 2323-B, Scranton, Penna.

Without cost or obligation, please send me a copy of your booklet, "Who Wins and Why," and full particulars about the subject before which I have marked X:

TECHNICAL AND INDUSTRIAL COURSES

☐ Architect	☐ Aviation Engines
☐ Architectural Draftsman	☐ Automobile Mechanic
☐ Building Estimating	☐ Plumbing ☐ Heating
☐ Wood Millworking	☐ Air Conditioning
☐ Contractor and Builder	☐ Sheet Metal Worker
☐ Structural Draftsman	☐ Steam Engineer
☐ Structural Engineer	☐ Steam Electric Engineer
☐ Electrical Engineer	☐ Civil Engineer
☐ Electric Lighting	☐ Surveying and Mapping
☐ Welding, Electric and Gas	☐ Refrigeration
☐ Reading Shop Blueprints	☐ R. R. Locomotives ☐ Air Brakes
☐ Telegraph Engineer	☐ R. R. Section Foreman
☐ Telephone Work	☐ R. R. Bridge and Building Foreman
☐ Mechanical Engineer	☐ R. R. Signalman
☐ Mechanical Draftsman	☐ Highway Engineering
☐ Machinist ☐ Toolmaker	☐ Chemistry ☐ Pharmacy
☐ Patternmaker	☐ Coal Mining Engineer
☐ Heat Treatment of Metals	☐ Navigation ☐ Boilermaker
☐ Bridge Engineer	☐ Textile Overseer or Supt.
☐ Bridge and Building Foreman	☐ Cotton Manufacturing
☐ Gas Engines	☐ Woolen Manufacturing
☐ Diesel Engines	☐ Agriculture ☐ Fruit Growing
	☐ Poultry Farming ☐ Radio
	☐ Marine Engineer

of New Products

BUSINESS TRAINING COURSES

☐ Business Management	☐ Business Correspondence
☐ Office Management	☐ Lettering Show Cards ☐ Signs
☐ Industrial Management	☐ Stenography and Typing
☐ Traffic Management	☐ Civil Service ☐ Mail Carrier
☐ Accountancy and C.P.A. Coaching ☐ Bookkeeping	☐ Railway Mail Clerk
☐ Secretarial Work	☐ Grade School Subjects
☐ Cost Accountant	☐ High School Subjects
☐ Salesmanship ☐ Advertising	☐ College Preparatory
☐ Service Station Salesmanship	☐ First Year College
☐ Wallpaper Decorating Salesmanship	☐ Illustrating ☐ Spanish
	☐ Cartooning ☐ French
	☐ Lumber Dealer

Name..... Age.....

Address.....

City..... State.....

Occupation.....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

MM maintains this department to aid readers with their problems

AUTO OIL FREEZES

Every winter the oil has frozen in my car, sometimes on the same day I have had it changed. I can always get it circulating by applying hot water to the motor, but would like to know where the trouble is.—E. H. B., Oneida, N. Y.

It is not the oil in your crankcase which is freezing, but rather a sludge made up of water, carbon, and oil. Water can get into the crankcase through leaky gaskets, or by condensation of exhaust vapors leaking past the piston rings. Too small passages through the oil feed lines, which clog in cold weather, will also cause your trouble.

CAN WOOD BE FIREPROOFED?

Am contemplating the erection of a wooden cabin in the country, which will be left vacant many months of the year. I would like to know if there is any practical method of fireproofing the timbers used in building my cabin.—I. S., Bronx, N. Y.

Wood may be fireproofed by treating it with a solution of 10 to 20 parts of potassium carbonate and 4 to 8 parts of ammonium borate in 100 parts of water. Enough solution must be used to penetrate at least one-quarter inch into the wood. This compound forms a protective covering over the wood when there is excess heat, and at the same time liberates flame-smothering carbonic acid.

AIRPLANE PROPELLER PITCH

What is meant by "pitch" of an airplane propeller? What size and pitch propeller is best for an air-propelled ice sled powered by a motorcycle engine?—M. W. B., Bowdil, Ohio.

The pitch of a propeller is the distance it will advance in one revolution if turning without slippage; it corresponds to the distance a wood screw advances in one revolution when turned in wood. A 4 to 5-ft. diameter spruce prop with 4-ft. pitch is about correct for twin and four cylinder motorcycle engines.

WILL TELEPHONE OPERATE LOUDSPEAKER?

Can you tell me whether it is possible to attach a loudspeaker to an ordinary telephone, so that both sides of the conversation may be heard by everyone in the house?—R. H., Ellis, Kansas.

Since telephone companies in most cities will not permit tampering with their equipment, you will have to use a small public address amplifying system. Place the microphone near your telephone, with a stand near it which will hold the phone receiver. A switch mounted in contact with the telephone hook will turn on the amplifier each time the phone is used, and shut it off when the receiver is replaced.

MOLD WAVES FOR SHIP MODELS

Please tell me what mixture to use in place of water to represent waves around a ship built inside a bottle. How can I color the waves?—R. W., Solvang, Cal.

Ordinary window putty is most easily molded into wave shapes, since it hardens slowly. Paint the sides of the bottle with blue oil colors first, then put in the putty. After it hardens, the waves may be painted blue, with a dash of white at the crests.

LOCATING GOLD CLAIMS

Can gold or silver mining claims be staked anywhere in this country by the prospector?—F. W. H., St. Louis, Missouri

Mining claims may be staked anywhere on government land, provided the correct procedure as prescribed by law is followed. Most of the mineral-bearing lands in the United States are now under private ownership; in this case mining rights may be purchased outright from the owner, or the land leased for mining purposes. Claims cannot be staked on privately owned land without the permission of the owner.

(Editor's Note—All letters sent to this department should include a stamped, addressed envelope. Write to M.M Problems Editor, 529 So. 7th St., Minneapolis, Minn.)

TEST the WEIL BELT ...at our Expense!

YOU will appear many inches slimmer at once and in 10 short days your waist line will be 3 inches smaller. *Remember* 3 inches of cumbersome fat gone or no cost! "I reduced my waist 3 inches" . . . writes Geo. Bailey. "Lost 50 lbs." writes W. T. Anderson . . . *Hundreds* of similar letters.

THE MASSAGE-LIKE ACTION DOES IT!

You will be completely comfortable as its massage-like action gently but persistently eliminates fat with every move! Gives an erect, athletic carriage. Restores abdominal walls and stomach to proper position, aiding digestion and elimination without drugs, diets or exercises!

Simply write name and address on postcard and we will send you illustrated folder and full details of 10 DAY FREE TRIAL OFFER!

THE WEIL COMPANY
303 Hill St., New Haven, Conn.

REDUCE YOUR WAIST 3 INCHES IN 10 DAYS OR ...it won't cost you one cent!

HAND-EE GRINDER

QUICKER BETTER JOBS

Weighs 1 pound. Plug in any light socket and do 1001 jobs. **Do away with slow hand work. Grinds, routs, drills, carves, sharpens, cuts, engraves.** For shop, home or tool kit. (Model A), A. C. or D. C. operation, 110v., 13,000 r.p.m. Order on 5 day trial . . . satisfaction guaranteed.

Ask for FREE Booklet

$10.00 and up Postpaid U. S. A. With 3 wheel shapes Free. Order today.

New MASTER CRAFTSMAN'S SET 17 useful accessories to grind, drill, polish, sand, cut, carve, engrave, etc. **Prepaid $5.00.**

CHICAGO WHEEL & MFG. CO.
106 S. Aberdeen St., Chicago, Ill.

WOOD SHAPER $3 post paid Less Cutters. (C.O.D. or outside U. S. $3.25)

"The Shapemaker"

Uses standard 5/16" cutters. Table is heavy gauge pressed steel, 8"x5¾"; stands 5⅝" high. Base, table support and spindle adjusting slide, heavy gray iron castings. Oilless bearings.

Order now or send 3c stamp for **NEW 1935 24-page Catalog** fully describing all our equally low priced power tools and accessories, including Jig Saw, Drill Press, Sander, Line Shaft, Lathes, etc., etc.

J. & H. METAL PRODUCTS CO. 480 St. Paul St., Rochester, N. Y.

7 Volumes CIVIL ENGINEERING for Examination

Shipped FREE

2,000 pages. 1,600 illustrations. New Revised edition by twelve of America's greatest engineers. Includes: Surveying, bridges, railroads, steel structures, municipal engineering, water supply, road building, etc. Spanish Grain Flexible Covers Gold Stamped.

Earn $5,000.00 a year and up Civil engineers are wanted NOW. Enormous amounts are being spent in all kinds of public works and not a dime is spent until the Engineer has prepared plans. Then He must direct the work. It's a big job and there are not enough men to go around. Everywhere you go, you see road work going on—water and sewer systems being built—vast projects of all kinds. Here is **Your Opportunity** to get the necessary training right at home. These books are complete and simply written so anyone can understand them. Start now on our FREE examination plan. Mail the coupon without obligation.

American Technical Society,
Dept. C-1320, Drexel at 58th St., Chicago

I want to BORROW the CIVIL ENGINEERING Cyclopedia for 10 days FREE. I will gladly pay the few cents express, but I am to pay nothing for the loan of the 7 big volumes if I return them within 10 days. If I wish to keep them I will send you $2 after the 10 days, then $3 a month until special advertising price $29.80 is paid. Send latest Edition.

Name .....

Address .....

(Attach letter stating age, occupation, employer's name and address)

Most Amazing TYPEWRITER BARGAIN

FREE HOME TYPING COURSE

10 DAY FREE TRIAL OFFER

NEW REMINGTON PORTABLE only 10c A DAY

FIRST TIME! Remington's new purchase plan now lets you buy a genuine latest model Remington Portable No. 5 direct from the factory for only 10c a day. Not used or rebuilt. Not incomplete. A beautiful brand new regulation Remington Portable. Standard 4-row keyboard, standard width carriage, margin release on keyboard, back spacer, automatic ribbon reverse; every essential feature found in standard typewriters. With your machine we send you *free* a 19-page course in typewriting. Teaches touch system quickly, easily. Soon you dash off letters quicker than with pen and ink. You also get a handsome, sturdy carrying case free.

10-DAY FREE TRIAL OFFER

FREE Typing Course Carrying Case

The amazing low price and easy terms now make it possible for you to buy this genuine complete Remington Portable for only 10c a day. But we cannot guarantee present prices long. Higher wage scales, rising cost of materials, everything points to higher prices. So we say, "Act now . . . while our liberal offer still holds good!"

You Don't Risk One Cent

Try this typewriter in your home or office on our 10-day FREE TRIAL OFFER. Then, if you do not agree that it is the finest portable *at any price*, return it at our expense. *You don't even risk shipping charges.* Don't wait. Mail coupon now. It's the best chance you've ever had to own so complete a machine for so little money. So act NOW!

CLIP COUPON NOW

Remington Rand Inc., Dept. 141-3
Buffalo, N. Y.

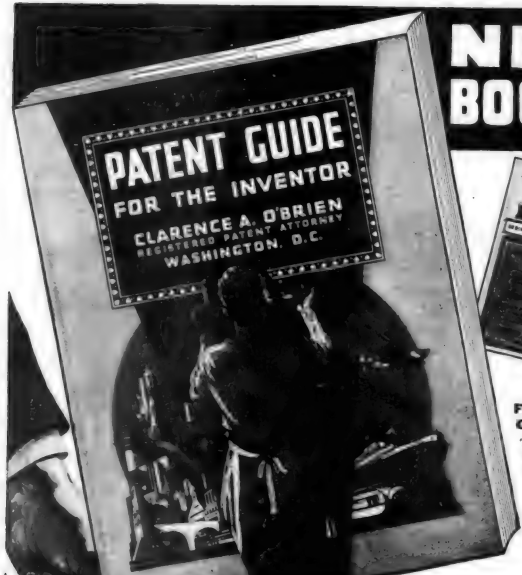
Please tell me how I can buy a new Remington Portable typewriter for only 10c a day. Also enclose your new catalog.

Name _____

Address _____

City _____ *State* _____

NEW BOOK for



FREE RECORD OF INVENTION

This FREE Record of Invention Blank enables you to make in convenient form a sketch of your idea and have it witnessed in a manner of value to you should the occasion for evidence arise.

INVENTIVE FIELDS

Is your invention something for the home, the farm, the factory, the store? Would you like to know whether anything like it has ever been invented? You'll find scores of examples of patents reproduced in my 48-page book. You'll get a good idea of whether you "have something" or not. Would you like to know how you may judge the marketability of your invention? This book gives you several important tests prepared by authorities. Read of the experiences of Bell, Edison, Westinghouse, and other outstanding, successful inventors who patented and thereby protected their inventions. This book not only tells you how to obtain patent, it explains the steps that must be taken afterwards to promote the success of your invention. It answers such questions as—What is an inventive improvement? What is the worth of an improvement? How should inventor arrange for manufacture? Has an unknown inventor a chance to make money? What are the qualifications of an inventor? What happens to the Patent Infringer? Can local attorney handle patent case? How did other inventors get started? What pitfalls should an inventor avoid? Can inventor learn whether his idea is worth patenting?.

CLARENCE A. O'BRIEN

INVENTORS

COMPLETE INFORMATION ON HOW TO OBTAIN PATENT AND MARKET INVENTIONS

If you have ideas, if you have invented something, if you're interested in inventing something, you need this new 48-page book that gives the entire Story of Patents. It tells you for the first time about new phases of invention, how others succeeded, how the patent laws protect you, how to market your invention, where to obtain finances, how to form a company, partnership, or arrange for royalties from your invention's sale.

NEW INFORMATION This book gives you actual statements, suggestions, and ideas from famous authorities who know the inventive field thoroughly.

PRACTICAL BENEFITS You will find 6 complete pages illustrated with simple inventions that have succeeded in six different fields of industry. Over 100 illustrations are in this book. You will read the stories of ten (illustrated) of America's most famous inventors. You will find an experienced and thorough survey of market conditions affecting the inventor—showing the possibilities for commercial invention today. Entire chapters are devoted to the value of a patent in promoting the final success of your invention. The importance of quick action in applying for patent is stressed—facts revealing danger of delay are emphasized.

If you expect to realize profits from your invention you must protect it with a U. S. Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, an invention, or an ambition to invent—get the information on obtaining patent AT ONCE!

WHAT A PATENT DOES FOR YOU Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

Anything you write me or send me is strictly confidential between us. All letters and drawings are kept in strong, steel, fire-proof files, which are open only to myself or authorized members of my staff. I have secured patents for inventors located in every State in the Union. The practice of my organization is confined entirely to Patents, Trademarks and Copyrights. I have had years of experience in Patent Matters. When you place your idea in my hands, I am in position to proceed at once to secure protection for you. My fees are reasonable, and if you desire, I can arrange convenient terms of payment.

Get This **FREE BOOK**

IMMEDIATELY MAIL COUPON TODAY!

This new 48-page book of facts is absolutely **FREE!** You need it NOW. Simply fill out the coupon, and mail. The field of invention changes constantly—here is the latest information on the most recent developments affecting inventive genius. Within a very few days you will receive our *Free* Book, together with the Record of Invention Blank described here. Write NOW—

CLARENCE A. O'BRIEN, Registered Patent Attorney
317-T Adams Building, Washington, D. C.

Registered Patent Attorney

Get **FREE COPY** *Write Today*

48 PAGES *Over 100 Illustrations*

CLARENCE A. O'BRIEN
REGISTERED PATENT ATTORNEY
317-T Adams Building
WASHINGTON, D. C.

Please send me your FREE BOOK, "Patent Guide for the Inventor," and your "Record of Invention" form, without any cost or obligation on my part.

NAME .....

ADDRESS .....

.....

(Important: Write or print name plainly)

Just 7 days

Photo by Tornello

. . . that's all I need to PROVE I can make YOU a NEW MAN!

By CHARLES ATLAS

Holder of the Title: "The World's Most Perfectly Developed Man"—Won in open competition in the only National and International Contests held during the past 15 years.

ONE week! That's all I need to PROVE I can make you a new man of vitality and power. I was once a 97-lb. weakling, with a flabby, flabby body. How I became "The World's Most Perfectly Developed Man" is told in my book, "Everlasting Health and Strength," which I will send you absolutely free.

Now I offer you a 7 days' trial of my famous method, **Dynamic Tension**, to PROVE that I can and will put firm layers of muscle where YOU need them most, tone up your whole system, and banish constipation, poor digestion, bad breath, pimples, joy-killing all-tiredness.

I've got no use for tricky weights or pulleys that may strain your heart or other vital organs. I don't dose or doctor you. My **Dynamic Tension** is the natural tested method. It builds powerful muscle, gets rid of surplus fat, gives you vitality, strength, pep that win the admiration and respect of every man and woman.

FREE BOOK! Send for your free copy of my book, illustrated with many actual photos. Learn how I changed from a weak, no-muscle "runt" to the physique you see here. Gamble a stamp to mail my coupon—to learn how YOU! can now win life's biggest prize—a handsome, healthy, husky body. Address CHARLES ATLAS, Dept. 63, 115 E. 23rd St., New York, N. Y.

CHARLES ATLAS,
Dept. 63, 115 East 23rd St., New York, N. Y.

I want the proof that your system of **Dynamic Tension** will make a New Man of me—give me a healthy, husky body, and big muscle development. Send me your free book, "**Everlasting Health and Strength.**"

Name .....
(Please print or write plainly)

Address .....

City ..... State .....

© 1935, C. A. Ltd.

High School Course in 2 Years

You can complete your High School education at home — in 2 years or less. Course meets all requirements for entrance to any college. Prepares you for business, industry, civil service tests supplied. Diploma awarded. Many graduates prepared for U. S. Government appointments. Send for Free Bulletin TODAY. No obligation.

American School, Dept. H-328, Drexel at 58th, Chicago

AVIATION!!

APPRENTICESHIPS

AIR-MINDED Young Men interested in entering the field of Aviation as Apprentices. Write immediately, enclosing stamp, to—

MECHANIX UNIVERSAL AVIATION SERVICE
13291 Ardmore Dept. A Detroit, Mich.

$ NEED MONEY?

Write for free booklet describing "87 Plans for Operating a Successful Business of Your Own". Make from $20 to $100 a week starting in spare time at home. No peddling or house-to-house selling. Booklet sent free, and without obligation. Write for your copy today.

ELITE PUBLISHING CO.
Dept. G 214 Grand St. New York, N. Y.

FREE BOOK

BE A POULTRY EXPERT

Make $40, $50, $60 a Week

Free book shows how to get started quickly. You'll be surprised at the amazing profit opportunities in the poultry business. Wherever you live—whatever you do—it is easy to start on a spare or full time basis. Free book tells all. Send for "How to Raise Poultry for Profit." You learn right at home in spare time by methods endorsed by colleges and leading poultrymen. Know how to get the maximum profits from interesting, healthy work. Iron-clad agreement protects you. We have prepared hundreds for big jobs and successful business of their own. Write now for free book. No obligation. **National Poultry Institute, Inc., Dept. 133, Adams Center, N. Y.**

FREE CATALOG OF PRACTICAL BOOKS . . .

Complete description of Drake books, covering RADIO, AVIATION, ENGINEERING, AUTOMOBILE WORK, BATTERY WORK, ELECTRICITY, BUILDING, SHEET METAL WORK, PAINTING, SIGN MAKING, LETTERING, COMMERCIAL ART, will be sent to you on request. Frederick J. Drake & Co., Dept. J-182 179 N. Michigan Blvd. Chicago

AUTOMOBILE COMPASS

Have you ever taken the wrong road and traveled many miles before discovering your mistake? This new AIRPLANE TYPE COMPASS constantly tells your direction of travel. Sticks to windshield. Base 1¾" diameter. ONLY $1.95, POSTPAID including Compensator. SATISFACTION GUARANTEED or your money refunded if returned within ten days.

DEALERS WANTED

HULL MFG. CO. Box 246-AJ, WARREN, OHIO

BE A RADIO OPERATOR

No experience needed. Beginners read code quickly, copy accurately. Hang up, cancel appointments, with approved, amazing master Telegiex. Has taught code to more than five years than all others combined. Used by U. S. Army and Navy. R. C. A. A. T. & T. Complete course, send postcard.

MONEY BACK GUARANTEE. Booklet M. M. 3.

TELEPLEX CO. 76 Cortlandt St., New York, N. Y.

Make Money at Home

Grow our famous Fancy White Queen Mushrooms. Exclusive new process. Bigger, better, quicker crops. More money for you! Enormous new demand. Illustrated book free. Write today!

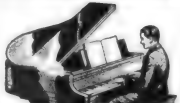
AMERICAN MUSHROOM INDUSTRIES, LTD.
962 Woolwich Bldg., Toronto, Ont.

EARN up to $25 A WEEK at Home

STRANGE FACTS ABOUT MUSIC — by Landron

BEETHOVEN WAS DEAF WHEN HE COMPOSED HIS FAMOUS 9TH SYMPHONY

A NOTE ON THE ORGAN... CALLED THE VOX HUMANA... CAN NOT BE TOLD APART FROM THE HUMAN VOICE



ANYONE CAN NOW LEARN TO PLAY MUSIC IN ½ THE TIME AT ⅓ THE COST — THE U.S. SCHOOL WAY AT HOME WITHOUT A TEACHER

New Easy Music-Teaching Method brings quick, sure results!

VOUCHED FOR BY 700,000 PUPILS

Thousands who never played music until a few months ago are getting thrills of enjoyment from a talent they never knew they had. By a simple new short-cut method you can actually begin to play any popular instrument without knowing one note from another. The secret of the U. S. School of Music system is simplicity. The lessons come to you by mail. They consist of complete printed instructions, simple diagrammatic pictures, and all the music you need. No grinding routine. Study when you feel like it—at home. In an almost unbelievably short time you find that you are actually playing! Jazz, musical comedy hits, movie theme-songs, even classics—you play them all—as easily as you now whistle or sing them. If popularity and the joy of making your own music appeal to you—send today for FREE Demonstration Lesson with illustrated book describing the new famous U. S. School of Music "print-and-picture" method of learning.

LEARN TO PLAY BY NOTE	
Piano	Violin
Organ	Ukulele
Guitar	Saxophone
Tenor Banjo	
Hawaiian Guitar	
Piano Accordion	
Or Any Other Instrument	

FREE PROOF!

Just mail the coupon. Then judge for yourself when you receive free demonstration lesson and descriptive material. U. S. School of Music, 2623 Brunswick Bldg., N. Y. C.

U. S. SCHOOL OF MUSIC
2623 Brunswick Bldg., New York City

Send me your amazing free book, "How You Can Master Music in Your Own Home," with inspiring message by Dr. Frank Crane; also Free Demonstration Lesson. This does not put me under any obligation.

Name .....

Address .....

Have you Instrument ..... Instrument .....

MAKE MONEY At Home!

EARN steady income each week, working at home. Colorful photos and miniatures fit oil. Learn about "Keehne Method" in few weeks. Work done by this method in big demand. No experience nor art talent needed. Many become independent this way. Send for free booklet, "Make Money at Home."

NATIONAL ART SCHOOL Inc.
3601 Michigan Avenue, Dept. 2863, Chicago, Illinois

CHEMISTRY

Complete, practical home-study courses prepared by some of the best-known chemists in this country, including ALLEN ROGERS, B.S., M.S., Ph.D.—Head of Department of Industrial Chemistry, Pratt Institute; L. M. TOLMAN, Ph.D.—Formerly Chief Chemist, Wilson & Co. Now Vice-President, United Chemical and Organic Products Co.; BRADLEY STOUGHTON, B.S.—Head of the Department of Metallurgy, Lehigh University, and OWEN L. SHINN, Ph.D.—Professor of Applied Chemistry, University of Pennsylvania.

Mail Coupon for Free Booklet

INTERNATIONAL SCHOOL OF CHEMISTRY

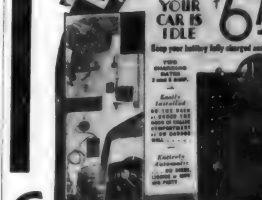
Associated with the International Correspondence Schools
Box 2325-B, Scranton, Penna.

Without cost or obligation, please send me full details of your home-study course in

- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Industrial Chemistry
- ☐ Short Chemistry Course
- ☐ Pharmacy

Name .....

Address .....



CAR OWNERS

The K R W Charger will pay for itself in savings. Send check or money-order—guaranteed as represented. Ask any Ford dealer about K R W. Agents and dealers wanted. Circular on request.

K. R. WILSON 18 LOCK ST., BUFFALO, N.Y.
EXCLUSIVE BUILDER OF APPROVED FORD SHOP EQUIPMENT SINCE 1915

Become an Expert Accountant

The Profession That Pays

The demand for skilled accountants—*men who really know their business*—is increasing rapidly. The new national and state legislation is requiring of business—both big and small—much more in matters relating to Auditing, Cost Accounting, Business Law, Organization, Management, Finance. Men who prove their qualifications in this important field are rapidly promoted to responsible executive positions—given an opportunity to earn real salaries. The range is from $3,000 to $15,000 a year—even to higher income figures.

Send for Free Book—
"Accountancy, the Profession that Pays"

Why let the other fellow walk away with the better job, when right in your own home you can equip yourself for a splendid future in this profitable growing profession?

Preliminary knowledge of bookkeeping is unnecessary. Our free book on accountancy fully explains how we train you from the ground up, or from where you now are, according to your individual needs. Low cost; easy terms.

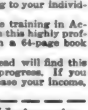
The facts about the new LaSalle training in Accountancy and the opportunities in this highly profitable field are clearly outlined in a 64-page book which LaSalle will send you *free*.

The man in earnest to get ahead will find this coupon a most profitable aid to progress. If you have the urge and the will to increase your income, clip and mail the coupon NOW.

LaSalle Extension University

The school that has trained over 1,200 C. P. A's

Dept. 3493-HR Chicago



I would welcome details of the new opportunities in accounting, together with copy of "Accountancy, the Profession that Pays," without obligation.

☐ **Higher Accountancy**

Other LaSalle Opportunities:

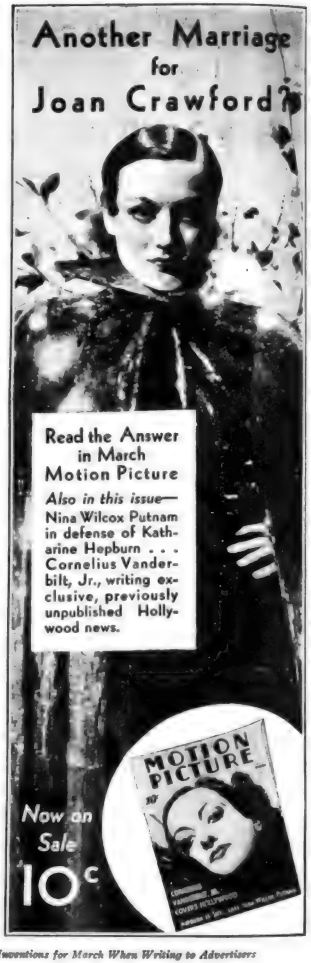
LaSalle opens the way to success in every important field of business. If interested in one of the fields below, check and mail.

☐ Business Management
☐ Modern Salesmanship
☐ Traffic Management
☐ Railway Accounting
☐ Industrial Management
☐ Commercial Spanish
☐ Effective Speaking
☐ Law—Degree of LL.B.
☐ Commercial Law
☐ Modern Business Correspondence
☐ Stenography—Stenotypy
☐ Expert Bookkeeping
☐ C. P. A. Coaching
☐ Business English
☐ Credit and Collection Correspondence
☐ Practical Accounting and Office Management

Name .....

Present Position .....

Address .....



Big Money

Assembling NEW SPORTSMAN'S BOAT

For CAMPING FISHING HUNTING SAILING

GIVEN! 8-ft. double-blade PADDLE now given with your Ki-Yak—if you hurry!

PAY AS YOU BUILD!

M E A D Sportsman's Ki-Yak is the most sensational boat development in years. Exclusive new structural features set a new standard for lightness, strength, durability, ease of assembly. Easily portable. Low introductory prices. Don't deny yourself the pleasure of knowing all about it.

Rush 10c for Catalog (Paddle now given with your Ki-Yak—if you hurry!)

MEAD GLIDERS
15 S. Market, Dept. M-3, CHICAGO

NOW FIX ANY MAKE OF AUTO

SIX BIG AUTO BOOKS ALL SHIPPED FREE

on approval; whether you want to qualify as garage owner, auto repair expert or merely wish to know how to keep your own car 100% efficient, look at these books—th are sent to you for free examination. This brand new edition has been prepared by a large group of America's greatest automotive engineers. Anybody who can read will understand them, for this great automobile encyclopedia is a veritable gold mine of valuable facts. Take advantage of this offer now; send in the Coupon for FREE examination. You don't pay as a penny, you don't obligate yourself to pay anything unless you decide to keep the books. Just tell us you want to see them and the full set of 6 great volumes, just off the press, will be sent to you! Read them, look them over and prove to your own satisfaction that one fact alone, which you will find in them, may save you an expensive repair, or help you to a better job.

Aviation Motors
Motorcycles
Rear Engine Cars
Outboard Motors
Octane Selectors
Tractors
All Fully Covered

1935 Edition

Imagine books which are so new that every page is right up to date—wiring diagrams, construction details, service problems—are all right up to the minute. Nowhere else can you get as complete and up-to-date information. Over a million dollars of resources have enabled us to give you the most authoritative books on the subject ever published. Everybody interested in automobiles in any way will welcome these books published by the world's largest publishers of Technical Cyclopedias (est. 1897) with agencies all over the world.

Can You Fix It?

Can you take out "play" in differential? Can you find the "oddness" in steering? Can you reset TIMING? Can you put your finger on engine trouble without guessing or tinkering? Can you pull the starter off and fix it? Can you adjust and repair transmission, engine, rear axle, bearings?

These Books Tell How

and tell you how to do any and every auto job right, the first time.

6 Big Volumes

Nearly 3,000 pages, over 2,000 illustrations, wiring diagrams, equipment charts, etc. In Lure edition with gold-stamped flexible binding. Sent FREE for 10 days' use. If not wanted return express collect. If kept, send only $2.00 after 10 days, then $3.00 a month until special advertising price, $24.80, is paid.

A Year's Consulting Membership FREE!

Privilege of consulting engineers of million-dollar American Technical Society on any automotive problem for one year without charge. If you mail coupon immediately. **American Technical Society, Dept. A3320, Drexel Ave. at 58th St., Chicago, Ill.**

LEARN WATCH REPAIRING

AT HOME You can learn by our modern and original system of instruction every part of the **Watch Repairing Trade** at home as good or better than at a shop. You can earn money while learning and secure a well paying position or start in business after completing our course of instruction. Good watch repairmen are always in demand and earn very good salaries. For particulars apply to the

MILWAUKEE SCHOOL OF WATCH REPAIRING
324 E. WASHINGTON ST. Dept. C MILWAUKEE, WIS.

LEARN TO DANCE

LEARN THE LATEST SOCIETY STEPS AT HOME WITH RADIO OR PHONOGRAPH MUSIC

A new original Method teaches you easily and quickly 26 Different Steps for all modern dances, WALTZ, FOX TROT, ONE STEP, PEABODY, THE NEW CONTINENTAL, TANGO ROUTINGS. Special lessons for leading any partner, for beginners and advanced dancers. Will make you MORE POPULAR and HAPPY, you will enjoy dancing and GET MORE ENJOYMENT OUT OF LIFE. Sent on 10 days trial. Write for full particulars without obligation.

IRVING SCOLNICK 147 WEST 43rd ST. NEW YORK

How To Secure A Government Position

Why worry about strikes, layoffs, hard times? Train now for a Government job. Many examinations expected! Increased salaries, steady work, travel, good pay. Let me help you become a Railway Postal Clerk, Post Office Clerk, City Mail Carrier, Rural Carrier—or help you get into any other Government job you want. I was a Secretary Examiner of Civil Service Commission for 9 years. Have helped thousands.

Now FREE My 32-page book tells about the jobs open—and how I help to qualify you to get one. Send the coupon for your copy TODAY.

A. R. Patterson, Civil Service Expert
PATTERSON SCHOOL, 433 Case Bldg., Rochester, N. Y.
Please send me without obligation, your free book "How to Secure a Government Position."

Name . . . . .
Address . . . . .

SEND NO MONEY

American Technical Society, Dept. A3320
Drexel Ave. at 58th St., Chicago, Illinois.

I would like to see the brand new 6-volume edition of your automobile books but without any obligation to buy. I will pay the few cents delivery charges only and will examine the books and return them at your expense in 10 days unless I like them, in which case I will send you $2.00 then and only $3.00 per month until the special price of only $24.80 is paid. You are to include free, consulting membership certificate in the American Technical Society. Send 1935 edition.

Name . . . . .
Street . . . . .
City . . . . . State . . . . .
Employer's Name . . . . .
Employer's Address . . . . .
Please give us, in addition, the name and address of one business man as reference.

Amazing! Sensational!

REFINISHES AUTOS Like NEW!

No Polishing, Waxing, Rubbing or Painting

KAR-NU Pays You UP TO $7 IN AN HOUR

JUST WIPE IT ON WITH A CLOTH. LASTS 8 to 12 MONTHS GUARANTEED

2,028 Other Uses

Heal-lac refinishing automobiles, KAR-NU has hundreds of other uses in the home, office, factory, store and shop. It refinishes typewriters, adding machines, cash registers, scales, desks, chairs, file cabinets, furniture, book cases, safes, etc.—in fact, anything made of metal or wood on which the original finish has become dull or discolored.

A new miracle discovery! A trans-parent magic-like fluid with which anyone can refinish any color automobile easy, quickly and economically without polishing, waxing, rubbing or painting. **JUST WIPE IT ON WITH A CLOTH!** Immediately dullness, discoloration, shabbiness and sun fade DISAPPEAR, INSTANTLY, as if by magic, the old paint is covered with a tough elastic coat which is absolutely transparent, self-leveling and self-polishing. KAR-NU actually fills the pores and rebuilds the old finish. Paint or Duco is rejuvenated, restoring the lustre, life, glos and beauty of the original factory finish. As KAR-NU dries it seals the pigment and protects the finish from further wear. Lasts eight to twelve months. GUARANTEED.

SALES GALORE! BIG PROFITS!

Enormous demand! Millions want it! W. L. Morgan, of Mass., earned $18.61 in a single hour. Sell to individuals, fleet owners, garages, auto accessory stores, used car dealers, etc. No experience necessary. Send no money for sample and details. Get in on ground floor. Just mail coupon—NOW.

Opportunity For Distributors in Foreign Countries

THE KAR-NU COMPANY
Dept. G-41 Oakley Station, Cincinnati, O.

MAIL COUPON TODAY!

NOT A WAX, POLISH OR PAINT

KAR-NU is entirely new and different—nothing in the world just like it. Now, no need to spend time, tedious, back-straining, muscle-tiring hours polishing, waxing and rubbing to produce a "mere shine" that is only fairly satisfactory—that lasts for only a short time, and that leaves the car looking worse than before when it wears off. KAR-NU is free from the labor and danger of scratched "cleaners" with acid- and abrasives that remove some of the finish each time they are used. KAR-NU produces a re-do't that is equal in beauty to a repaint or refinishing job which costs $25.00 to $75.00.

This Seal of Approval awarded by the Testing Laboratories of the Automobile Club of Illinois shows that KAR-NU is a product of merit and does all we claim for it.

FREE SAMPLE COUPON

KAR-NU CO., Dept. G-41,
Oakley Station, Cincinnati, Ohio.
Rush FREE SAMPLE to prove your claims about KAR-NU, and Territory Offer.

Name .....
Address .....
Town ..... State .....

Turn Cheap Oil to Gas Heat

HEATS 25% CHEAPER Than Other Fuels

Send name for free book on LAOIDS sensational new Mineral Wick automatic oil burner. World's lowest priced. Saves 25 per cent of fuel costs. Gives better flame with less oil. Goodrich (Mfg.) says, "Saved me $40 over one heating season." Clean, odorless, safe. 10,000 in use. GUARANTEED.

WRITE! Get low price, one to convert dealer, or factory-costs. Get No-Risk Offer and Free Book. SEND NOW!

Laco Oil Burner Co., 235 Union Ave., Cotonaid, Ia.

Look Here, DEALERS! Low-cost price and fast-moving lines help my dealers outsell others. Can ship from sample burner, on approval, subject to examination, no obligation. Write quick for my offer.
L. A. CHAMBERLIN, Pres.

NEW SCIENTIFIC WONDER "X—RAY" CURIO

Reg U S Pat Off

10c 3for 25c

"Silver Coin" Only

BOYS BIG FUN. You apparently see thru Clothes, Wood, Stone, any object. See Bones in Fish. **FREE PRO.** radio picture films, taken pictures without camera. "You'll like 'em." 1 pkg. with each 25c order.

MARVEL MFG. CO., Dept. 88. NEW HAVEN, CONN.

Men Wanted at Once

Make Money Calling on Stores

New occupation. Pays big money at once without investment. Introduce sensational new line to and 10c necessities to stores. Self sellers. Permanent repeat business easy. Experience unnecessary. Start Free Write

PRO-CO-TAX
Dept. 37-90
1956 S. Troy
CHICAGO

NEW TENNIS INVENTION

My amazing new WONDER TENSION-TIGHTENER invention enables anyone to increase your returning business—assures uniform string tension—banishes "hand pulling". Low cost. BIG Profits and Instructions, 30c prepaid. Write today for NEW INVENTION DETAILS!

W. A. SICKEL, 909 W. Madison, Dept. 23-83 CHICAGO, U. S. A.

TURN SCRAP INTO MONEY

The new and revised edition of "Auto Power" with all the ten original specifications and ten new ones is now off the press. Convert old generators into A. C. and D. C. generators and motors with voltages of 6 to 600 volts, for power, light, welding, and radio operation. Create new generators adaptable for home, automobiles, or trucks. They can be driven by fan belt, wind or water. This book, with complete illustrations, tells you how easily and economically these changes can be made. Also instructions for rewinding auto armatures. 250 definitions of electrical terms, etc. Already used and endorsed by thousands. Price, only $1.00.

AUTO POWER Dept. A 412 S. Hoyne Ave. Chicago

BECOME A RADIO EXPERT

RADIO — IN ALL ITS BRANCHES

TELEVISION — ACTUAL BROADCASTING

ELECTRICITY — COMPLETE GENERAL TRAINING

BROADCASTING — COMMERCIAL STUDIO FACILITIES

TALKING PICTURES — MODERN OPERATING EQUIPMENT

Be a radio expert. Biggest opportunity in 1935. Under guidance of practical instructors you quickly qualify for expert jobs, including Radio Repair Man, Television Expert, Control Operator, Station Technician, Sound Expert, Ship-operator, Broadcaster, Electrician, etc. All courses at price of one.

LEARN IN LOS ANGELES

Enroll in oldest, largest trade school in West. Est. 1905. 30,000 graduates. Most delightful place to train. You operate actual equipment and learn by practical shop experience. Our own broadcasting studio.

EARN ROOM AND BOARD

The majority of students earn living expenses during enrollment. With limited finances you can enroll.

R. R. FARE ALLOWED

For limited time coach railroad fare from any part of U. S. to Los Angeles will be allowed.

SEND COUPON FOR FREE BOOK AND DETAILS.

NATIONAL RADIO & ELECTRICAL SCHOOL - Los Angeles

Dept. 3-MMR, 4006 So. Figueroa St.
Send Book and full details of Courses.

NAME .....

ADDRESS .....

CITY .....STATE .....

Get PAID HOURLY

MAKE BIG MONEY!

Showing my sensational, new, personalized Hat and Cap Sample Line—fits in pocket—displays values men grab for—rich felts—exclusive styles—superior qualities. Priced as low as $1.95. Nothing to deliver. Just write orders and pocket your profits. Fit and Satisfaction Guaranteed.

COMPLETE OUTFIT SENT FREE!

You don't invest a penny to get this money-making opportunity. I even give hats and caps to sincere salesmen. Send me your head size and name—get the facts. You can start pocketing cash in five minutes with my plans. Rush name.

TAYLOR HAT & CAP MFRS.
Dept. 6-C
15-17 W. 6th St. Cincinnati, Ohio

MADE TO MEASURE

Exclusive maker of nationally famous Taylor Rainproof Caps, the classy headwear. Smart new patterns—lower prices—no experience needed to make big cash profits hourly—Elliot, Utah, took five orders the first 15 minutes.

Any Man, or Boy, who has a Passion for Making Things Needs this Book

IT'S ONLY A DIME

This book tells you how to make Electro-Magnets, Electroplating Outfits, Secret Locks . . . and 30 other Electrical Devices. You'll find the directions and diagrams easy to follow. Satisfactory too . . . because everything you make will work . . . 100%.

96 Pages—costs a Dime—Don't go another day without it

You'll never get more *real* instruction for any dime you've ever spent than what's crammed between the covers of this book. Send 10 cents (coin or stamps) to Room 1328, Dept. MMI 353, National Carbon Company, Inc., 30 East 42nd St., N. Y. C.

NEW DEAL
Government JOBS

Start $1260 to $2100 a Year

PICK YOUR JOB
MEN, BOYS—18 to 50

Travel—See Your Country

Railway Postal Clerks get $1,900 the first year regular, being paid on the first and fifteenth of each month. ($79.17 each pay day.) Their pay is quickly increased, the maximum being $2,700 a year. ($112.50 each pay day.)

3 Days On—3 Days Off—Full Pay

Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same proportion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.

City Mail Carriers, Post Office Clerks

Clerks and Carriers now commence at $1,700 a year and automatically increase $100 a year to $2,100 and $2,300.

Customs and Immigrant Inspector

Salary $2,100 to $3,300. Men 21 to 45. Work connected with examining immigrants and merchandise entering the country from foreign parts.

Winter and Spring Examinations Expected

Many winter and spring examinations are expected throughout the country and those wishing positions should qualify at once.

Get Free List of Positions

Fill out the following coupon. Tear it off and mail it today—now, at once.

This investment may result in your getting a life big-paid government job.

FRANKLIN INSTITUTE, Dept. M-292, Rochester, N. Y.

Rush to me entirely free of charge (1) a full description of the position checked below; (2) Free Copy of 32-page book, "How to Get a U. S. Government Job"; (3) A list of U. S. Government Jobs; (4) Tell me how to get a Government Job.

- ☐ Railway Postal Clerk.....(Start $1900 year)
- ☐ Post Office Clerk.....(Start 1700 year)
- ☐ City Mail Carrier.....(Start 1700 year)
- ☐ Government Clerk—File Clerk.....(Start 1200 year)
- ☐ Inspector of Customs.....(Start 2100 year)
- ☐ Immigrant Inspector.....(Start 2100 year)

Name .....

Address .....

Use This Coupon Before You Mislay It

NEW WAY TO SMOKE

Imagine Taking LIGHTED *Cigarettes from a Magic Case*

If you could carry LIGHTED cigarettes harmlessly in your vest pocket . . . and just pull them out at your convenience . . . all ready for smoking . . . wouldn't that be wonderful? Here is a New Way to Smoke . . . just as easy and amazing.

LOOK! I take a shining, beautifully enameled case from my vest pocket. I touch a Magic Button. A miracle happens. Automatically a cigarette appears. At the same time there is a spark . . . a flame. A single motion . . . the pressure of only one finger . . . and a LIGHTED, ready-to-smoke cigarette is delivered right between my lips.

WHAT A MAGIC INVENTION!

Who ever imagined such a marvelous device. It's Dynamic . . . Revolutionary. We spent a king's ransom and years of effort developing the Magic Case. But now it's here . . . perfected . . . guaranteed . . . ready for the waiting millions. Wherever the Magic Case is shown men and women gather round and gasp with delighted surprise. Everybody who sees a Magic Case wants to own one . . . and it's priced so low everybody can afford it. As a result there is a surging, overwhelming demand for Magic Cases that is pouring thousands upon thousands of dollars into salesmen's pockets.

HERE IS YOUR CHANCE FOR QUICK PROFITS

There are hundreds, thousands, perhaps tens of thousands of men and women in your locality who would buy on sight if they could only see a Magic Case. Think of your money-making opportunity if you had the exclusive right to hand out Magic Cases in your territory. Here's glorious opportunity for you. We have devised a 5 Way Money-Making Plan that shows you how to earn these profits without selling. Get the facts, that's all we ask. They fairly SCREAM big profits.

MAGIC CASE MFRS.
4234 Cozens Ave. Dept. C-3549 St. Louis, Mo.

15 DAY TRIAL OFFER

Take a Magic Case on 15 Days' Trial at our risk. Try it . . . show it . . . see how you're almost overwhelmed with orders. Get our 5 WAY PLAN that shows you how to cash in on this great invention WITHOUT SELLING. Act NOW.

REQUEST FOR TEST SAMPLE

MAGIC CASE MFRS., Dept. C-3549,
4234 Cozens Ave., St. Louis, Mo.

Gentlemen: I'll take you up on your Test Offer. I want a big share of Magic Case profits. Tell me how to start and what to do to put a Magic Case in my hands for 15 Days' Trial at your risk.

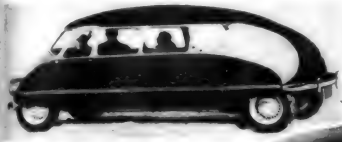
NAME .....

ADDRESS .....

TOWN ..... STATE .....

Stout Produces FIRST REAR ENGINE AUTO

The most startling and revolutionary evolution in modern automobile design is revealed in this preview of the new "Scarab", designed by William B. Stout.



Above—A side view of the new Stout auto, showing the beetle-shaped design and the driver's seat placed over the front axle.

Right—The floor of the new auto is set to the level of the running board, permitting entire elimination of the running board and allowing five inches of extra overhead room within the "living room."

ULTRA streamlined, with an engine mounted in the rear, the driving mechanism over the front axle, and an interior designed like a room in a house, the most revolutionary development in the history of automobile construction was presented to the American public for the first time February 1.

The new car is the Scarab, designed and produced by William B. Stout, famous Detroit airplane engineer who designed the first all-metal airplane and the Ford tri-motor transport ship.

It follows the latest in aero-dynamic design with long windows extending from front to rear to permit clear vision. Fenders and running boards are eliminated; the body of the automobile encloses the wheels.

Following the principles of stress analysis which he propounded in the October, 1933 issue of MODERN MECHANIX AND INVENTIONS, Stout has incorporated the body and chassis into one, setting them over a frame of alloy steel tubing after the fashion of an airplane fuselage. The body is suspended below the center of gravity to eliminate "roll," making it possible to dine or play cards while the car takes corners at high speed.

The floor of the Scarab is lowered to running-board height. Each wheel rides on an individual shock absorber, huge coil springs equipped with oil cylinders, extending from the wheel to the lower window lines. They combine with the rear-mounted engine to provide a cushioned shock in collisions.

A view showing the elaborate interior of the Scarab. In the rear are two movable chairs, a lounge, and a collapsible table. High speed will not jar ash tray on the table.

A built-in lounge and table feature the "living room" interior. The driver's seat is the only one than cannot be moved. The other two can be placed as desired.

Television Will Carry

A twinkling beam of light records a picture thousands of miles away. It is facsimile transmission—an interesting feature of this authoritative article on the future developments of radio and television.

IN HIS struggle for new information, man has been reaching farther and farther into mysteries beyond his accustomed sphere; farther with the runner through the forest . . . farther with camel caravans across trackless plains . . . farther with ships into uncharted oceans . . . seeking speed, and relishing the advantages of new contacts. From the start, mankind has struggled for better communication.

Communication is civilization's pace-setter. The creeping progress of the past was over muddy trails and bridgeless rivers.

Civilization has lagged when communication has faltered. Surprising new arts were developed, employed and eventually lost in the slumber of the ages. Those that endured won their way about the earth slowly. Nations adhered to old ways not so much because they liked to labor in the ancient, clumsy manner, but because improvement remained isolated, undetected, unheralded over long periods to people of other sections.

Civilization has progressed as communication has gone forward. The telegraph and telephone gave modern industry its great onrush. Radio has augmented those services amazingly, not only by providing an unprecedented method of reaching great masses of people instantly and simultaneously, but also by giving the world swifter, surer, more direct contacts.

It has been my policy to refrain from definite prediction as to the time when television might be brought from the research laboratory and offered on a commercial basis to the American public.

Definite progress has been made each year

Left—Charles J. Young shown with the new simplified device for sending photos by radio. Above—A facsimile scanner used in the existing system of international short wave operations.

the Mails

by

DAVID SARNOFF

PRESIDENT,
RADIO CORPORATION OF AMERICA

Above—David Sarnoff President of the Radio Corporation of America and author of this article on the future of radio.

in research and development leading to sight transmission by radio. The latest development in television research is the perfection of the "iconoscope"—an electric eye—which has advanced the technique of television by facilitating the pickup of studio action and permitting the broadcast of remote scenes, thereby giving to the television transmitter the function of a camera lens.

Through the use of the iconoscope, street scenes and performances in studios have been satisfactorily transmitted and received by television, on an experimental and laboratory basis.

Nevertheless, some important problems re-

The Radio Corporation of America's central plant located at Rocky Point, Long Island. It is in this plant that much of the pioneer work in the field of television has been evolved.

lating not only to the technical side, but also the commercial side of television still call for solution. These problems relate principally to the cost of erecting and operating the necessary television transmitting stations, their interconnection for wide-range service, the price at which television receiving sets can be successfully manufactured and sold to the public, and the production of suitable programs.

While it is impossible to anticipate the exact time when this development can be introduced on an industrial basis, it may nevertheless be said that the progress made by laboratories and engineers has brought us much nearer the goal when transmission of sight will be added to transmission of sound.

Particular importance, both with respect to new radio communication service and television, is attached to the research and engineering carried on in the field of ultra short radio waves.

The creation of extremely small radio tubes has produced a new avenue of approach to the problem of using ultra short waves. Tubes have been developed with a diameter of only five-eighths of an inch having the internal elements fitted into a space about the size of a pea. They are especially effective on wavelengths in the region of one meter or below.

My faith in the future of radio science is geared to facsimile and television. And facsimile, the transmission of still pictures, is the gateway to television. These developments will produce not only new means of entertainment, but also new methods of communication.

Since Morse invented the telegraph there has been no radical improvement in telegraphy. Morse, a poet as well as an inventor, created the Morse code of dots and dashes which is still in international use.

No longer must the message be broken

[*Continued on page* 140]

Upper left—A photoradiogram of the late President Coolidge sent from London in the first test of wireless photo transmission by R. C. A. Lower left—V. K. Zworykin with his thermionic photo-electric tube which utilizes the power of light, sending out radio impulses whenever exposed. Lower right—A telephoto of the Roosevelt inauguration.

Craftsman Earns Living Making Gold and Silver Telephones

PORTER BLANCHARD, Los Angeles inventor, takes a great delight in beautifying the more simple household articles found in every home and has even gone so far as to produce telephones from silver and gold at a total cost of $500 each.

The phones, of the ordinary French type are entirely taken apart and dipped into an electroplating solution. Current is passed through the solution to plate the various telephone parts.

Several times during the process, the parts are removed and polished to a glossy smooth finish to insure an even result. The plating is about the thickness of paper.

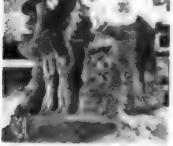
Photo shows Porter Blanchard, the man who makes his living through his hobby of creating phones in gold and silver.

Triangle Solves Math Problems

The geometric triangle facilitates quick solving of problems.

A TRIANGULAR little geometric instrument recently perfected, is designed as an aid to the mathematician and will, with a little adjustment, furnish solutions to the simpler problems of algebra and certain forms of the more complicated branches of mathematics. The instrument supplies solutions of complicated formulas involving multiplication, addition and subtraction at the same time. A guide curve aids the operator to read the logarithm of any desired number without numerical calculation.

Swiss Carve Man's Head In Snow



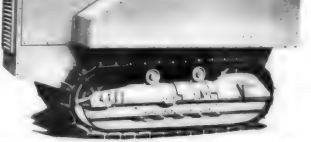
A well sculptured snow head built by the natives of Grimsons, Switzerland. The block is 20 feet high.

HIGH up in the Swiss mountains, snow sculpturing is one of the favorite winter amusements, whole villages often vying in competition. Of especial interest this year was a beautifully sculptured head in Grimsons cut from a block of snow 20 feet high.

Farm Tractor Is Also War Tank

LIKE a broken down plow horse turning into a snorting, spirited cavalry charger, a new farm tractor has been devised that can be converted into an armored tank equipped with gas and machine guns in a space of two hours.

The tractor is of the caterpillar type and is capable of surmounting anything from ditches to fallen trees. Its traction wheels are especially good for work in mud. Scrap metal was used to armor the original model.



The new tank two hours after it pulled out of the fields as a farm tractor. Note the heavy armor and the machine gun.

PARAGRAPH ODDITIES OF SCIENCE

THE highest price ever paid for steak is $48 per pound. This enormous price was paid in Circle City, Alaska, during the Klondike gold rush.—A. Campbell, St. Louis, Mo.

In grain mill and elevator fires, the use of water to kill the flames is more dangerous than the fire itself. High pressure water hoses stir up the grain dust in the building—dust that is highly explosive when touched off by flames.—Robert Lynn, Waseca, Minn.

The age of a fish can be determined by the number of rings on his scales. The scales develop two rings during each year of growth. — C. Reynolds, Long Beach, Calif.

The alligator is the only animal that can move its upper jaw.—Max Bortnick, Fox Valley, Sask.

Man killing clams are often found off the coast of Australia with shells weighing as much as 155 pounds. Pearl divers fear them as no amount of struggling can free a victim from the grasp of their powerful jaws.—E. Eustace, Shrewsbury, N. J.

Two Diving pigs that plunge into the water in search of fish, have been attracting much attention around Lake George, Florida. The pigs have reached the weight of 200 pounds each on their wholesome fish diet. —Thomas Newman, Seville, Fla.

Nic Sprank

Slot Machine Ejects Bad Coins

Photo shows a man inserting a coin in the automatic collector at a New York subway turnstile. The collector tests the coin, returning counterfeit nickels through a slot in the side.

SLUGS, washers, and counterfeit coins will no longer admit a person through the turnstiles of the New York subways since the recent installation of ingenious machines that will accept only genuine nickels.

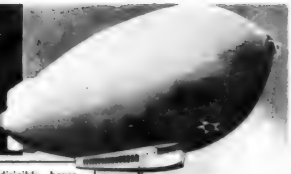
When a nickel is placed in the machine, it first passes before electro-magnets set to reject all coins of suspicious metallic content. If the coin passes the magnets, it goes to a weighing device which throws out all coins above or below the average weight of a nickel. Rejected coins are thrown back through a slot in the side of the machine.

Starter Button Is Fool Proof

A NEW "foolproof" motor starter cannot be started accidentally by a bump or fall, due to the fact that the stop button extends around and beyond a recessed starter button. With this device, a motor can only be started by pressing the recessed button with the finger. The button is designed to prevent accidents.

The stop button extends around and beyond the starter button.

All-Metal Dirigible Lowers Passengers IN ELEVATOR CAR

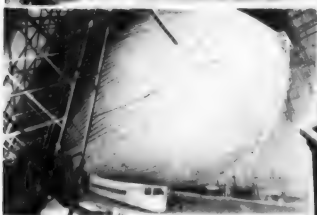


New dirigible hovers anywhere when gas tank anchor is lowered. Right: A loading scene. Ship is 275' long, 75 in maximum diameter.

AN ALL-METAL dirigible now being built for transcontinental freight and passenger service, the first lighter-than-air craft considered practical for commercial use, takes on or discharges its load without landing. The anchor—which really is the main fuel tank—is first lowered. An elevator cage using the anchor cable as a guide then lowers passengers to a rooftop or other convenient location.

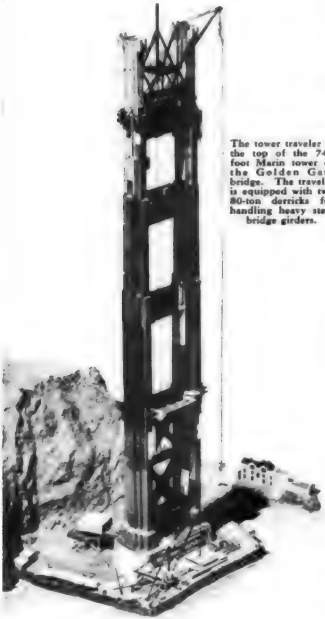
A blower type propeller and 2,800 h. p. gasoline engine in the nose of the ship replace the usual gondola power units. The vacuum created in front of the ship and the slipstream around it are expected to give a cruising speed of 120 m. p. h.

Since these 40-passenger dirigibles may be converted into bombers in three hours, the government is encouraging their production. A million-dollar manufacturing plant is soon to be built at Fullerton, California



Passengers are lifted to gondola in metal car pictured above. Bag is made of duralumin, and is one single compartment, with long corrugated strips cemented rather than riveted together. Cruising radius with full load is 3,500 miles.

World's Longest Bridges Span San Francisco Bay



The tower traveler at the top of the 746 foot Marin tower of the Golden Gate bridge. The traveler is equipped with two 80-ton derricks for handling heavy steel bridge girders.

HIGH over the surging tides of San Francisco's Golden Gate, the two towers of the world's largest single suspension bridge stand in defiant majesty as symbols of man's victory over natural forces. And farther back, the eight mile skeleton of towers and piers stretch across the San Francisco—Oakland bay, ready for the spans which will complete this, the world's most costly bridge project.

These bridges, built at a total cost of $112,000,000, are being erected to aid traffic in and around San Francisco. The bridge to Oakland cuts the 30 mile trek around the circuitous shoreline of the bay to a straight 8¼ mile trip across the bridge; the Golden Gate project eliminates a detour of approximately 80 miles for direct coastal traffic between Canada and Mexico.

Since the beginning of the work on the two bridges, 18 construction records have fallen. Thirteen of these were broken in the building of the San Francisco-Oakland-bay bridge, declared by President Roosevelt to be the

The San Francisco Bay metropolitan area comprising nine counties bordering the bay. The long point in the foreground is the San Francisco business district. Arrows indicate the new bridges. Photo courtesy Pacific Gas and Electric Co.

largest construction project started in the United States in 1933, and rated by engineers as tenth among the structural wonders of the world.

Built at a cost of $77,000,000, 6.7 per cent of the total steel produced in the United States in 1933 went into the construction of this gigantic project. It will support a double highway 235 feet over the bay 8¼ miles, from San Francisco to Yerba Buena Island and from Yerba Buena to the city of Oakland.

Fifty-one piers and three cable anchorages were required to make the crossing. Especially unique is the center anchorage in the middle of the West Bay which is designed to take strain from both sides as the common anchorage of two suspension spans. To resist this terrific pull, it is sunk 220 feet into the bed-rock and towers 235 feet above low water level. The anchorage is 197 feet long, 92 feet wide, and has an overall height of more than 500 feet.

The San Francisco anchorage on Rincon Hill is a gravity type cement cube, a huge

by CHARLES W. GEIGER

A comprehensive article on the Golden Gate and San Francisco Oakland Bay bridges, telling of man's struggle with nature to complete, at a tremendous cost, two of the most daring construction feats ever undertaken by American engineers.

A view taken inside the oval fender showing the metal frame used for lowering the divers into the water and for removing him from the bottom to the surface. Divers were often compelled to work 100 feet under water surveying pier sites.

OAKLAND BRIDGE ROADWAY TUNNELS THROUGH

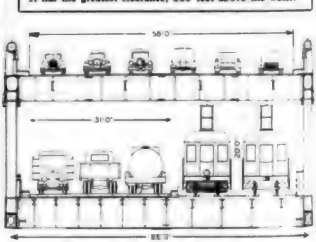
Above—Bridge workers handling a steel girder on the Oakland Bay bridge. San Francisco is seen in the background. Lower right—A cross section of the Oakland Bay bridge. Below—Beginning the construction of the world's largest vehicular tunnel on Yerba Buena Island. Photo courtesy Associated Oil Co.

Records Of San Francisco Oakland Bay Bridge.

The world's most expensive bridge—cost, $77,000,000.
The world's longest highway bridge—8½ miles long.
Has the most piers of any bridge in the world with 54, three of which are anchorage piers.
It entailed the pouring of concrete 242 feet below water.
It required the sinking of a caisson 228 feet.
Excavation was carried on 242 feet under water.
It spans 9,000 feet of navigable water.
The project required the construction of the largest twin highway tunnel.
It has 70,800 miles of supporting cable.
It has two suspension bridges built in tandem.
It was the largest construction project started in the United States in 1933, using 6.7 per cent of the country's total steel output.

Records Set In Building The Golden Gate Bridge.

The first bridge to be built across the open sea.
The world's longest suspension type structure with a single span of 4,200 feet.
It has the highest bridge towers in the world—746 feet.
It has the greatest clearance, 220 feet above the water.



TYPICAL CROSS SECTION OF BRIDGE

ROCKS AT YERBA BUENA

mass of masonry sunk deep into the earth; supported by its own weight, and rising 200 feet to the level of the bridge. The Yerba Buena anchorage will be accomplished by gouging two cable tunnels 160 feet into solid rock.

Four concrete and steel piers, rising from 474 to 519 feet above the water will support the cables from which the spans of the two-mile double bridge will be suspended.

The use of Yerba Buena Island as a mid-anchorage necessitated the cutting of a 540 foot vehicular tunnel to connect the two sections of the bridge. Seventy-eight feet high and 67 feet wide, double decked and steel-lined, it is the longest tunnel of its kind in the world.

The East Bay crossing between Yerba Buena Island and Oakland will consist of a cantilever span 1,400 feet long with two 510 foot anchor arms, five simple spans each 500 feet long, and 14 truss spans each 290 feet long.

The bridge structure, at its easterly end, terminates two miles from shore in the shallow water and tide flats of the East Bay. Here it is joined by a four-mile fill highway extending to shore at Oakland and then swinging north over the tide flats to Berkeley. The construction of this highway requires one-half million cubic feet of sand fill and 348,000 tons of protecting rocks.

The bridge comes into San Francisco 175 feet over the harbor, so high above sea level that the Palace Hotel of San Francisco could easily be slipped underneath. The lower deck of the bridge, used for heavy trucks and interurban cars, first touches ground on precipitous Rincon Hill; the top deck reaches ground 4,200 feet to the westward. Curved ramps swing from the top deck at Rincon Hill for motorists bound in diverse directions.

The construction of pier E3, adjacent to Yerba Buena Island is a feat that will go down in the annals of engineering history.

[*Continued on page* 141]

Above—A view of the oval fender of steel construction built to facilitate the pouring of the cement piers. A cement seal inside the steel permitted the water to be pumped out to provide a dry working area one hundred feet below the surface of the water. Photo courtesy Associated Oil Co.

Above—Photo shows a cross section of the steel fender rising fifteen feet above the water level to provide permanent protection for the inclosed concrete tower base. Lower left—The diagram shows the comparative sizes and the dimensions of the world's three most gigantic bridges.

Crystal Balls Tracing Planet Paths on Globe Predict Weather

With this crystal-studded schoolroom globe J. C. Brown hopes to predict weather, years ahead, through movements of planets.

POSITIVE predictions of weather at any future time are declared possible by James C. Brown of La Porte, Texas, once an eleven year period of tests for his "Astronomer" weather machine reaches completion.

Depending upon movements of the planets for its weather predictions, the machine consists of an ordinary schoolroom globe on which have been traced the paths of the sun and moon. Crystal balls placed in pairs at 45 degree latitude on each side of the equator burn paths around the globe which, in the course of 24 hours, will record any variation in movements of the sun, moon, or stars.

The long test period is necessary to set up charts. Future readings of the machine can then be compared with similar readings on the charts to obtain the weather forecast. Movements of certain bright stars can also be recorded on the globe.

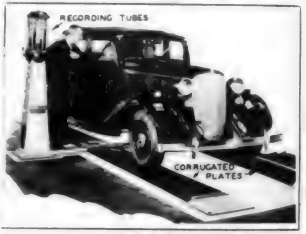
Driver Faces Load On New Truck

IN THE newest of contractor's dump trucks, seat and controls are reversed to enable the driver to face the load at all times.

The front wheels, directly under the driver, are used for steering, though these are actually the rear wheels when the truck is in motion. The short wheelbase makes maneuvering of the truck very simple.

Backward-running dump truck lets driver run up to pit or fill without craning neck. This model carries 6-ton loads.

Brake Tester Gives 4 Readings



Entirely mechanical is this auto brake tester. Braking thrust on each floor plate is shown in glass recording tubes. Charts then tell stopping distance of car at any speed.

A SIMPLE brake tester having no auxiliary motors of any kind indicates on calibrated glass tubes the braking power of each of the four wheels, as well as the distance in which the car will stop at any speed.

The car is driven on the device and stopped with a wheel on each of the corrugated floor plates, reproducing true road conditions in stopping.

When a car is stopped by braking, about ⅛th of the weight is transferred from the rear to the front wheels. This extra load on the front brakes is accurately recorded by this tester, but not by any static brake test.

Scientist Fakes Voice on Sound Films

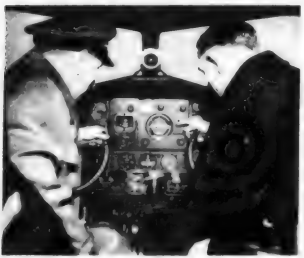
DUE to clever experiments recently conducted in Munich, Bavaria, by Rudolph Pfenninger, talking films can now be produced without the aid of a human voice, and musical notes can be produced with a quality of tone purity that cannot be gained by any instrument known to man.

Working in an entirely new field, Pfenninger conducted his work by making a close study of the curves by which sound is reproduced on film. Having determined the exact curves required by specific sounds, he drew them on paper and had them photographed onto a sound film.

Although still in the experimental stages, it is predicted that the idea will soon be practical for film work. Several short films have already been made with moderate success.

Drawing sound curves to reproduce the human voice. Shown in the lower left are the sound curves for the vowels, a, e, i, o, u. Lower right—Preparing the curves for photos.

Automatic Control Guides Plane



High over Boeing Field in Seattle, aviators test the automatic control which guides a plane in response to pressure on buttons. Human pilots are needed only to land the plane.

"BACK SEAT" driving for aviators is made possible through the new automatic pilot which is said to make a plane virtually fool-proof in the air. By simply pressing buttons the plane will successfully go through maneuvers without human assistance.

The new instrument is gyroscopically controlled. It will take the plane off the ground and level it at the exact height set by the operator at the instrument panel. Thrown into a spin by a wind-pocket, it will cause the plane to straighten out automatically.

The plane needs a human pilot only for landing purposes. During times of war, such a plane could be loaded with high explosives and directed toward its objective by radio.

Uncanny Machine Forecasts Death

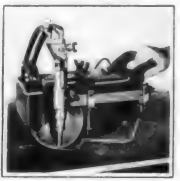
A MACHINE which studies the structural nature of blood cells is said to be able to predict approaching death with more accuracy than it can be done by an experienced physician.

The result of this experiment was reported after the study of 8,000 cases by M. Lecomte de Nouy and his colleagues at the Pasteur Institute in Paris. They experimented with the blood of men, horses and sheep.

In their studies, the scientists used either the serum or the plasma of the blood, both of which are invisible to the human eye but colored in the eye of a spectroscope.

Tiny Motor Drives Cutting Torch

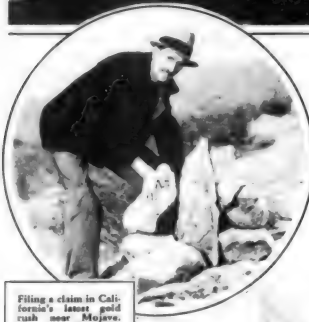
A NEW acetylene cutting torch is propelled smoothly across the cutting surface by a compact motor. The unit is easily guided by the hand to follow all curves and will cut steel plates two inches thick.



Above—The tiny motor aids the hand in guiding the acetylene cutting torch over the cutting surface.

Building a Gold Mine Fortune

A general photo of the mine showing the scaffold, the shaft head, and the power house. The power house was built from salvaged lumber and houses the power plant constructed from the chassis and motor of an old Dodge automobile.



Filing a claim in California's latest gold rush near Mojave. The claim is staked out with three foot monuments covering a statement of claim.

Howard Wheery at the old hand windlass set over the course of the old vein. The junk made scaffold and shaft head rear high into the air in background, as landmarks of success.

SHORTY PARFET, How Wheery, Walt Ziege and Rudolph Vrobel were determined to find a gold mine—and they did.

Not only found it, but realized it was a rich strike. They put that mine into fairly large scale operations on an initial cash capital outlay of $4.25!

The story of these four men who knew what they looked for, and did not quit before they found it, is a roaring affirmative answer to the question of whether or not a man without capital but with a vast willingness to work, study and stick to it, stands a chance in the western gold districts today.

When I started on a hunt to find a typical example of what men with nerve, grit, and little cash can do, I heard of a number who started on a shoe-string and now are making good. Significantly, I heard of no small-outfit placer working that was paying more than reasonable wages; most of them not that. The big chance lies in the unworked veins of old established gold camps or new districts so there the hunt started.

Shorty Parfet and his gang were the first outfit I talked with. There was no need to seek further. Here was a case typical, full of genuine help and inspiration for the fellow really in earnest about wanting to find himself a gold mine.

Parfet, whose initials are W. S., is stocky, red-haired where he isn't bald, has a friendly grin, and unlike most miners he talks will-

from a Four-Dollar Stake

by ARTHUR HAWTHORNE CARHART

How four Colorado prospectors fought against odds to set up large scale operations in a rich gold vein with a capital of $4.25 is revealed in this interesting story of a "Small Man" mining camp.

ingly. He was a fighting, able-minded member of Colorado's Twenty-ninth Assembly and lives near Central City. He and Howard Wherry are the old heads; the other two the young huskies. It is a good combination.

"Know a mine when you see one," advises Shorty, "and then just scratch and dig intelligently until you meet up with what you're looking for. Meanwhile study and work."

As an employee to a big mining outfit, Parfet had access to many properties, their records, assays, and the veining system. The others were similarly constantly learning all they could about mining in general and this mineralized zone in particular. You see, it is the old story; you hear of someone who has "stumbled" onto a rich mine, and when you begin to run it down you find there was no stumbling about it. They knew where they were going and saw the way clearly.

Many stampeders cannot recognize gold unless it is the coarse native gold of a rich placer—and then it may be "fool's gold." Truly, the rich ore of this mine looks like rusty clay and muddy iron filings; nothing else. But these fellows knew, when they saw it, that it promised mineral values. Undoubtedly there have been some of those same stampeders who are grouching out of

[*Continued on page* 133]

Photo shows Walt operating the "hand made" power plant constructed from an old Dodge motor.

Shorty Parfet (standing) and How Wherry with the outfit that discovered the mine—ore, pick, bucket, mortar, a piece of drill steel for pestle, a screen bottomed box, and prospectors' pan used to separate the gold.

TABLE BISCUIT OVEN LEADS NEW HOME GADGETS

TABLE BAKING OVEN makes piping hot, fluffy biscuits right on the breakfast table. New stainless chromium steel baker is heated by powerful electric elements, giving perfect baking in a few minutes. Biscuits are placed on a narrow tray having room for up to eight, and slid into the oven for baking.

WALL BRACKET unit complies with modern-day demand for indirect lighting by providing glareless light. Attached to the wall by a non-slipping needle point pin, it may be moved with ease to any part of the room or house. The shade swings down for direct lighting, if desired.

ONE-CUP COFFEE MAKER has simplicity appreciated by men who must rise early, make their own breakfast. Coffee is placed in central wall, maker placed over any cup, then filled with boiling water. Water drips through grounds into cup in about three minutes, when coffee is ready. Tea is made in same manner.

NUT BUTTONS are the smart thing for women's sport and outdoor garments. Hickory nuts, walnuts, and hazel nuts are buffed, polished, matched for size and color, and regular button eyelets attached.

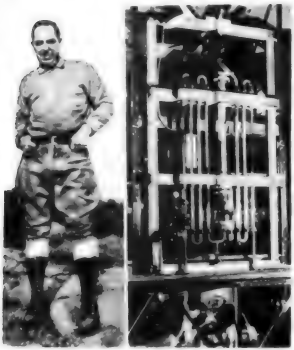
Tractor That "Walks" Has No Drive Wheels to Slip in Mud

A TRACTOR which uses two legs to push it ahead, instead of the customary drive wheels which slip and spin in mud ruts, is the newest in power equipment for the farmer. Though working models have already been built and tested, the inventor cannot state when his machine will be ready for production.

In one of the earlier models, a three-wheeled affair with steering done by the single rear wheel, a small gas engine turns a double crankshaft through a speed reducing belt and wheel combination. Legs attached to this crankshaft propel the machine, one doing the pushing while the other is moving forward for the next step. In heavy mud the tractor would be lifted up as well as pushed forward, and broad paddles placed on each of the "walking legs."

Mud holds no terrors for this tractor—it walks along with first one leg, then the other pushing. In this early model a small gas engine drives crankshaft wheel through a belt.

Gold Ore Refined By Electricity



Equipment at right is used to separate gold from finely divided ore in revolutionary process developed by Elman B. Myers (left). High voltage electricity seizes gold flakes.

GOLD mines in hitherto inaccessible locations may now be worked successfully by means of a revolutionary gold-recovery process developed by Elman B. Myers, radio expert. As much as 98.7% of the gold in the ore is obtained by first crushing the raw mineral to colloidal or infinitesimal particles in a rotor mill, then passing the powder through tubes filled with mercury.

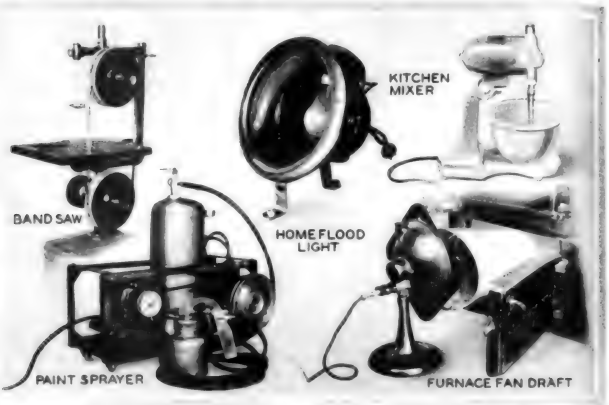
Tiny Automatic Clutch Saves Gas

CLAIMING increases of from 6 to 8 miles per gallon of gas on a Ford V-8 car, McKinley Palmer plans to place his midget automatic clutch device on the market this spring. No larger than a tomato can, the simple unit is bolted to the side of the automobile motor, the clutch pedal removed, and a few simple adjustments made. The new clutch is operated by vacuum created in the intake manifold of the carburetor.

Palmer's device automatically controls the clutch in perfect time with the motor, and in addition acts as a free wheeling unit. An older model has been in use for 110,000 miles of driving without attention of any kind. The inventor, who resides in Beverly Hills, California, has spent seven years in perfecting his clutch.

Inventor McKinley Palmer demonstrates simplicity of his new automatic clutch for autos. Device attaches to most modern cars, saves gasoline by preventing racing of engine.

New Contest Offers $125.00 in Cash;



Above are some suggestions for mechanical contrivances for home which may help in working out your entry for this contest.

RULES FOR FOURTH CONTEST

Designs for mechanical devices of any size, for which there is some use about the home may be entered in this contest. Each entry must consist of working sketches and a clear description, of less than 1,000 words, telling just how the article was made. Photographs, while not required, may be used in place of some of the sketches.

Readers may submit as many entries as they wish, whether or not they have entered the first three contests.

MODERN MECHANIX AND INVENTIONS reserves the right to publish the designs of any winning entry without further compensation to the contestant.

Each contestant agrees to permit MODERN MECHANIX AND INVENTIONS to publish all or part of any entry not winning a prize. Regular rates for the amount of material used will be paid in such cases. No manuscripts or photographs of entries will be returned.

Prizes will be awarded as follows to the fourteen most practical entries: First prize, $60.00; Second prize, $20.00; Third prize, $8.00; Five fourth prizes of $5.00 each; Six fifth prizes, $2.00 each; Total $125.00.

The decisions of judges, who will be editors of MODERN MECHANIX AND INVENTIONS, are final. In case of ties, duplicate prizes will be awarded.

Address your entries to Home Mechanics Contest Editor, MODERN MECHANIX AND INVENTIONS, 529 So. Seventh Street, Minneapolis, Minn. All entries must reach this office before midnight, March 22, 1935. Winners will be announced in the June, 1935 issue. Winners of the second contest for furniture ideas will be announced in the April issue.

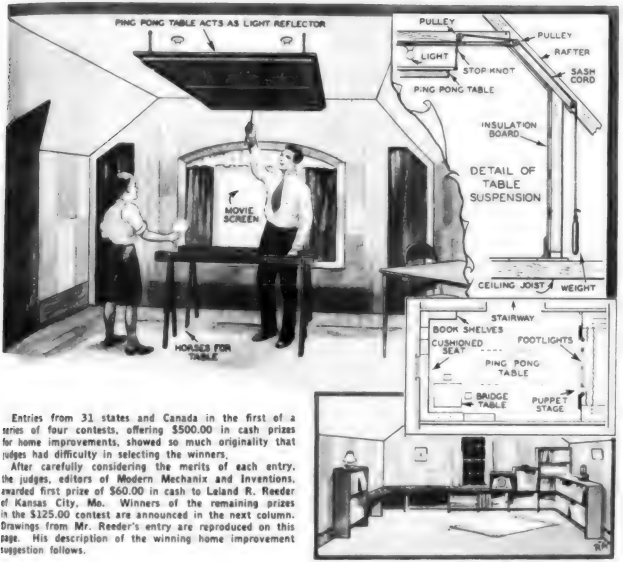
HAVE you ever designed or made some practical mechanical contrivance which either eliminated small menial tasks or improved some part of your home? If you have, or can, here is your chance of winning one of 14 big prizes in this $125.00 cash contest. Simply tell us, in not more than 1,000 words, how it was built, and include clear working sketches or photographs.

This contest is the fourth and last in the Home Improvement series offering $500.00 in cash prizes. Submit as many entries as you like, but follow all contest rules.

New uses for old machines offer a fine field for entries. The portable paint sprayer shown above is made from a discarded washing machine engine, an old auto air compressor, and a pressure tank.

Another example is a forced draft unit for the furnace, made from an ordinary house fan. Other suggestions are the home-made band saw for the workshop, the improvised home floodlight made from an automobile head lamp, and the kitchen mixer made from a vacuum cleaner motor.

Here are Winners of First Home Contest



Entries from 31 states and Canada in the first of a series of four contests, offering $500.00 in cash prizes for home improvements, showed so much originality that judges had difficulty in selecting the winners.

After carefully considering the merits of each entry, the judges, editors of Modern Mechanix and Inventions, awarded first prize of $60.00 in cash to Leland R. Reeder of Kansas City, Mo. Winners of the remaining prizes in the $125.00 contest are announced in the next column. Drawings from Mr. Reeder's entry are reproduced on this page. His description of the winning home improvement suggestion follows.

by LELAND R. REEDER

THE accompanying plans for a recreation room were designed for use in converting an old-fashioned attic into a cozy room for study, for games, or for presentation of home movies.

Measurements are purposely omitted, since the size of the room available will govern the manner in which this idea is carried out. The attic roof must first be checked for leaks. If existing floor joists are not at least of 2"x6" material, run additional joists alongside the old ones.

Flooring, if old or rough, should be covered with a good grade of linoleum. Build a par-

[*Continued on page* 120]

DECEMBER CONTEST WINNERS

The fourteen winners of $125.00 in cash prizes offered in the December, 1934 Home Improvement Contest were selected by the judges as follows:

FIRST PRIZE, $60.00: Leland R. Reeder, Kansas City, Mo. His winning entry appears on this page.

SECOND PRIZE, $20.00: H. E. Ramsey, East Lansing, Mich. Entry described a conservatory and clothes drying room addition to the basement.

THIRD PRIZE, $8.00: Mrs. W. J. Wade, Bridgeport, Conn.; a window nook and increased closet space for bedrooms.

FOURTH PRIZE, five of $5.00 each: Henry Olsens, Cleveland, O., a simple method of plastering attic walls; Louis Jean, Sacramento, Calif., remodeling home for extra bedroom; John H. Fields, Chicago, Ill., den arrangement for the attic; R. C. Gangewere, Chattanooga, Tenn., remodeling basement; Ernest J. Coons, Crawfordsville, Ind., converting porch to sun parlor.

FIFTH PRIZE, six of $2.00 each: Joe W. Carr, Chatham, Ontario; Hugo C. Loebel, Amery, Wis.; Arnold Retzloff, La Crosse, Wis.; Lee M. Enochson, Arnegard, N. D.; P. R. Bulkley, Colorado Springs, Colo.; Adolph Luker, Clear Lake, Ia.

Hose Mixes Cement; Sprays It On Dome

Above—A view of the planetarium dome, erected without costly cement moulds. Inset—A close-up of the mixing and spraying hose used in constructing the huge dome.

A HUGE hose which sprayed mixed cement from its nozzle was used for the first time in the construction of the new planetarium dome at the Museum of Natural History in New York.

Through this method, the cost of erecting an elaborate system of concrete forms was entirely avoided. Instead, a temporary dome-shaped backing was set up and covered with steel wire webbing. The cement was then sprayed over this in even layers.

Two hose lines feed the unique nozzle. One carries a dry mixture of sand and cement; the other carries water. The pressure within the nozzle changes the mixture to concrete, and it is sprayed on the building to the desired thickness.

Ford Adopts New Decimal System

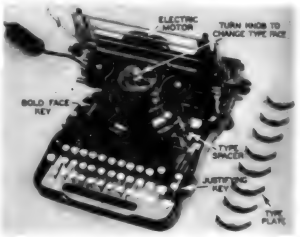
AS A STEP in the simplification of tool making, designing and manufacturing, the Ford Motor Company has adopted a new system of decimals to supercede the "common fraction" divisions of the inch. This system eliminates the bothersome changing of fractions to decimals. It will be of great help to automobile craftsmen and designers.

Rides Cycle On Handlebar Frame

Daredevil Coindet riding above the handlebars of his speeding motorcycle, steering by balance.

DAREDEVIL COINDET, world's champion stunt motor-cyclist has evolved an exhibition trick that calls for a wealth of iron nerves. Speeding along a curved road at fifty miles per hour, he climbs onto a frame over his handlebars and steers the cycle by balancing his body. A fall would result in death or serious injury.

Typewriter Has 200 Type Styles



This new typewriter has 200 type faces. It is the same size as the ordinary typewriter, weighs less and has 100 less parts.

A NEW typewriter that uses 200 various styles and sizes of type and characters for most of the leading foreign languages plus 60 different styles of English lettering has recently been perfected.

The machine holds two different styles of type at the same time, but the type faces, mounted on a small metal clip can be changed in a few seconds. Fastened to the clip as a unit, they cannot fall out of line.

Special open-faced types are provided for use with condensed spacing so that a page of typing may be put into a half page without losing its legibility, and an electric motor controls a spring in such a manner that the impression is uniform regardless of how hard the keys are struck.

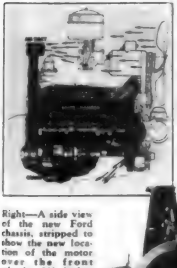
Mechanical IMPROVEMENTS of 1935 Autos

Above—A photo of the 1935 Dodge sedan which eliminates the conventional dust apron, bringing the doors almost flush with the running-board to add beauty of line. Lower left—The Dodge front suspension features softer springs, double action hydraulic shock absorbers and a rubber-cushioned ride stabilizer.

Above—A cross-section of the new solid steel "turret" top found on the Pontiac, the Oldsmobile, and the Master Chevrolet. The roof is composed of a single sheet of seamless steel, extending from the front to below the rear window. This is laid over a section of acoustic felt and fastened to steel bows.

Right—A view of the finger control gear-shift on the steering wheel bracket of the new Hudson. While the car is in gear, the selector lever may be moved and the shift will not change until accelerator is lifted.

Below—The addition of the new crankcase ventilating system in the 1935 Ford V-8 engine is designed to cool the oil and minimize the collection of excess water and sludge. Arrows show passage of air through engine.



Right—A photo of Engineer H. N. Roberts testing the oil temperature of the new Plymouth engine. The new motor has a full-length water jacket and a system of directed water circulation to cut down the excessive heat of a speeding motor.

Right—A side view of the new Ford chassis, stripped to show the new location of the motor over the front wheels, 8½ inches farther forward than the engines of the 1934 models. Both seats are placed between the wheels.

SHARP SHOOTING on the

Above—The correct bowling grip as executed by Andy Varipapa, sensational trick bowler. Center right—Proper grip for the straight ball. Lower right—Proper grip for a "hook" or curve ball. Lower left—Joe Falcaro, world's champion, demonstrates the correct stance for approach.

by

ELMER H. BAUMGARTEN

Secretary of the American Bowling Congress

A RISING hollow roar re-echoes through the room as a gleaming, swiftly-moving ball speeds down the flood-lit alley toward its objective—ten wooden pins set up into a triangular shape. Nearing the pins, the ball cuts into a sharp breaking curve and snuggles between the one and three pins. There follows the crash of tumbling hardwood. Pins fly in all directions. It's a strike!

This is the scene in alleys all over the country as sportsmen fight it out on the line in the most popular of winter indoor sports—bowling.

Bowling is a game that knows neither age nor sex limitations, providing benefits both physical and mental. The game develops coordination of mind and muscle. It strengthens self confidence and calls into play all the muscles of the body, at the same time providing enjoyment that can not be found in any other game.

Unlike most competitive sports, bowling offers full enjoyment to the beginner from the start. The game involves no awkward positions to embarrass the novice; nor does it have many technicalities too difficult for the average person to learn. Of course, there are tricks to good bowling. It is the learning of these tricks plus the resultant polish attained by practice that add to the interest of the game for beginners.

The smashing strike is seldom a gift of fortune.

Watch an experienced bowler. Note that he always begins his delivery from the same spot on the alley, and his ball is always set in motion from the same spot on the foul line. His lithe swinging stride is never ended with a choppy step to stay within the foul-line bounds. He has measured that distance carefully to avoid such a disconcerting short step. The rhythmic back swing, the release of the ball as the right foot touches the floor before the line, and the sweeping "follow through" are all the results of intelligent practice.

Beginners should first of all find a ball that nestles comfortably into the hand. Take a relaxed position at the approach, holding the ball with both hands before the body. Then,

BOWLING ALLEYS

1	2	3	4	5	6	7	8	9	10	TOTAL
X	X	X	—	\	X	0	X	\	X	
30	58	77	86	106	124	132	152	170	190	190

A specimen bowling score is shown above. Explanation of the actual play resulting in this score is found in the article.

Joe Falcaro releases his famous "hook" ball. Note his perfect balance—body bent at hips, left leg forward, and right leg bent at the knee for support.

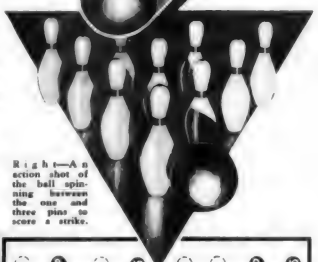
in measured strides, approach the foul line, reaching it with the body bent forward from the hips and the left foot forward. Co-ordination and timing should be so perfected that the ball is released from a straight pendulum swing of the arm the instant the left leg is the farthest forward. The right leg should be bent at about a 45 degree angle from the thigh.

The crashing speed delivery is not necessary to good results. The fast ball squirts the pins off the alley before they have a chance to fall into a horizontal position to cover a wider area on the alley bed.

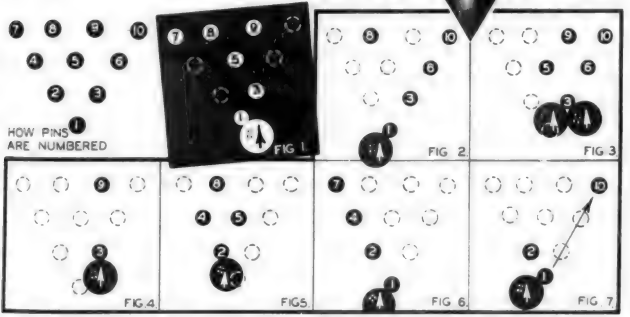
After a bowler has determined the sort of shot in which he excels, he should shoot with the same approach, placing the ball in the same spot on the foul line with as little variation as possible.

Some bowlers, of course, look at the pins from the time they start their run until the ball is delivered. This is careless bowling, and usually about as effective as shooting a gun in the air to hit a rabbit running on the

[*Continued on page 122*]

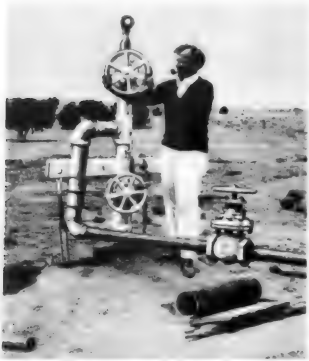


Right—An action shot of the ball spinning between the one and three pins to score a strike.



Above diagrams demonstrate a few of the spares most commonly encountered in the bowling alleys. The dotted circles represent the pins that were cleared from the alley with the first ball; the full circles represent the pins left standing. The large ball with the arrow shows just at what point the bowling ball must strike the remaining pins to clear them from the alley.

First Carbon Dioxide Line Carries Gas to Dry Ice Plant



Preparing to turn the gas from the Wilcox Dome well into the six-mile pipe line leading to a dry ice plant in a nearby city.

CARBON DIOXIDE, the rarest natural gas in the world, has been discovered beneath the desert wastes of Wilcox Dome, fifty miles east of Albuquerque, N. Mex., which has the distinction of being the only district in the United States producing natural carbon dioxide.

As yet, only one well has been sunk. It is producing carbon dioxide, 98 per cent pure, at the rate of 600,000 cubic feet per day. Several new wells are now under construction near the number one well. They are expected to be finished in the near future.

As the well holes are sunk, they are filled with pipe, and when the gas comes rushing forth, it is diverted into a main pipe line and carried to a storage tank for future use.

The gas from the Wilcox Dome well is now being piped six miles to a nearby city where it is used in the manufacture of dry ice.

New Gas Puts Victims to Sleep

A NEW gas alleged to have been discovered in the mystery laboratory of Philip del Fungo Giera is said to be so expansive that it can put a whole army to sleep in a minute. It is so powerful that a man carrying a small vial can overcome anyone within a 300 foot range.

The gas puts the victim to sleep for two hours without any harmful effects. The eating of a special pill renders the user immune to the sleep producing gas.

Razor Flips Open for Cleaning

The blade is held in the razor by a clip fastened at the hinged end.

DESIGNED to eliminate the removal of a razor blade for cleaning, a new razor can be flipped open without falling apart. The blade, itself, is unusual, having one edge set for coarse shaving, the other for close shaving.

Girls Dance On Stage Ceiling

SONG writers have written fantastic songs about dancing on the ceiling; Joseph Brierly and Roy Lankton, Hollywood inventors, produced an apparatus that made it possible.

For forty-eight weeks, patrons of a big-time vaudeville circuit were mystified to see chorus girls swinging their legs with careless abandon as they danced on the ceiling in a precarious inverted position.

Mirrors and other stage trickery were suspected, but the real truth never leaked out.

Each girl wore a canvas harness beneath her regular costume. The harness, made of leather, fit like a bathing suit and contained an iron ring at the crotch into which was snapped an invisible wire attached to a rolling carriage on a ceiling track.

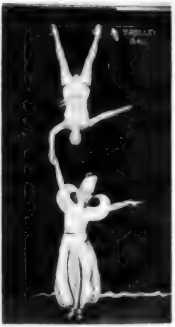


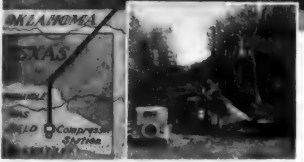
Photo shows a girl performing while suspended from the ceiling.

800-Mile GAS Pipe Line Burrows Through Five States

Snaking the pipe line across the Minnesota river near Minneapolis. Tractors pull the closed-off pipe through the water with long chains and cables.

All ditch digging was done by manual labor inside Minneapolis city limits to give work to unemployed residents.

Tractor cranes swung the snake-like pipe line into waiting trenches after crews had joined sections of pipe with flexible couplings. Tractor in foreground is pulling pipe ahead.



Machines like this cut the 2-foot deep trench for the 800-mile line. Map indicates path taken by pipe through five states.

NATURAL gas belching noisily out of wells in the Amarillo fields of Texas is now being used as fuel by residents of Minneapolis, Minnesota, more than 800 miles away. Burrowing its way under prairie and mountain, river and stream of five states, a 16-inch diameter steel pipe line is the underground railroad which makes this remarkable feat possible. Minneapolis with its 500,000 population and scores of surrounding trade centers is the latest district to become a part of a gigantic nation-wide spiderweb of pipe lines bringing natural gas fuel to over 8,000 cities in the United States.

Clamps and gaskets having great flexibility join together the long lengths of pipe in the Texas-Minnesota line. Crews of men continually assemble pipes above ground, just alongside the trench cut by the digger. Following the workers is a tractor crane, which rolls the long string of pipes into the ditch. Covering machines now fill up the trenches, the pipe lying buried to an average depth of two feet.

Pivoted Doors Resist Wind By Swinging In To Open Out

These bronze doors, installed at Kanawha Valley Bank in Charleston, West Virginia, pivot inward when pushed out, as shown. Compression springs on pivot arms close door.

SWINGING on pivots at top and bottom instead of by the usual hinges, the newest of all-metal doors equalizes wind pressure automatically, and may be pushed open easily against even a 50 mile an hour gale.

The door can really be said to swing in as it opens out, for pressure on the latch side causes the other half of the door to swing inward on the pivoted arms at top and bottom. Light compression springs mounted in the jamb and door itself automatically and silently close the door, and keep it tightly in place.

In an installation at the Kanawha Valley Bank Building at Charleston, West Virginia, three of these pivoting doors, made of bronze, are placed side by side at the entrance. Ordinary door latches and locks are used.

The development of this novel hinging arrangement came about through need for an all-metal bank door which could be opened easily by feminine patrons at all times.

"Pal" Enjoys Rides On Bike-Sled

NOTICING that his police dog "Pal" was having difficulties in getting across the smooth ice of a nearby lake, Ralph Gero of Shrewsbury, Mass., proceeded to provide taxi service for his playmate. The novel combination bicycle and sled was made by removing the bicycle front wheel and bolting in its place a sled. Guy ropes run from the handlebars to each corner of the sled.

"Pal" once slipped and slid over the smooth ice of this Massachusetts lake; now he rides proudly on a novel bike-sled built by Ralph Gero, his master.

Street Cars Get "Sunshine Roofs"

This double-deck "tram," built for service on the streets of Blackpool, England, has large glass windows over "sunshine deck." Styling of interior and exterior is patterned after modern motor car, with luxurious upholstered chair seats.

ENGLAND'S new streamlined trolley cars, advertised as the last word in luxury and speed, boast sunshine roofs on the second deck for passengers who wish to gather sun tan as they ride. The giant double-deck "trams" have luxurious traveling accommodations styled after those in the modern automobile.

Gleaming chromium bumpers and twin headlights add to the motor-car resemblance. Entrance is made through a single wide door at the center of the left side.

Slicing SECTIONS for MICROSCOPE WORK

Only a razor blade, a holder, and a steady hand are needed in preparing thin slices of plants and animal tissues for study under the microscope.

by J. D. CORRINGTON, Ph.D.

In chipping method of obtaining sections, demonstrated at left, fingernail on left forefinger controls thickness of slice. Use sliding motion when cutting to avoid tearing of delicate tissues. In circle above is rotary microtome, automatic machine used in many laboratories for preparing sections. Knife here remains stationary while object moves rapidly up and down as flywheel is turned. Arrangement of mason jar at right is for washing slices.

COULD you put a camel through the eye of a needle? Absurd, of course, yet it might be accomplished if one sliced up a camel on a microtome. This delicate precision instrument can cut sections of plant and animal structure so thin that the opening in a needle seems as wide as a barn door in comparison.

The microtome is a little like the meat slicer your butcher uses. Some will cut slices of organs only one-half a micron in thickness! This is a slice only .00001968 inches thick—and just about invisible.

In order to observe the detailed construction of plant or animal organs, thin sections must be prepared for the microscope. The free-hand method is used by most amateurs, since the microtomes or slicing machines are very intricate and expensive.

For beginners and for numerous advanced purposes, the free-hand method is as good as any, and far more easy and rapid. Cultivate the necessary skill and keep practicing—you will be able to turn out beautiful preparations with no other equipment than a razor.

The safety razor blade held in a folding carrier is preferred by most amateurs, since dull blades can be replaced easily. The holders are obtainable at dime stores.

Plant stems may be sectioned as soon as they have been collected. Choose young and green stems for this work, since they cut more easily than older ones. Two slicing methods are in vogue; in the first the thinnest possible sections are chipped off by a downward chopping motion of the knife as illustrated in the accompanying photograph. In the second the specimen is held in the left hand, the knife in the right, and sections cut by pulling the blade toward the operator.

The first method may be likened to whittling, while the second corresponds to paring. In each case the cut made is a sliding, slicing

[*Continued on page* 130]

Training TRANSPORT *Pilots*

Mystic radio beam dots and dashes cutting narrow path through clouds, fog and night guide this 200 m.p.h. liner of the air (above) over transcontinental routes. Co-pilot (at right) gets weather and barometer pressure reports from dispatcher (in circle) by means of two-way radiophone system on long waves.

GONE are the so called "good old days" of aviation when most anybody who could take an airplane off the ground and get it back again without cracking it up could obtain an official looking license and forthwith start out hauling passengers through the skies for hire or pleasure.

No longer can novices "practice" on the public. The Aeronautics Branch of the Department of Commerce is tightening up on regulations to protect those who use the commercial air lines of this country.

In tightening up the regulations on transport pilots, the government is merely trying to prevent inexperienced pilots from risking the lives of other people in the sky.

Big time flying has become a big man's job. The transport pilot is the cream of commercial aviators—the cock of the walk at any airport in the world. Masters of all the complicated wheels, motors, and gadgets on an airliner's instrument panel—masters of the air itself are the transport pilots. Dressed in attractive blue uniforms, with wings as big as pigeon pinions spread across the trim official caps, these men are the pride of commercial aviation.

Transport pilots must know a lot more than how to fly an airplane. Anybody can get up to the bridge of an ocean vessel and learn to steer it, but this would not qualify him as captain of the ship. It is the same with the transport pilot. It isn't so very far back to the day when planes had nothing but a clock on the dash panel. The throttle was the only thing in the cockpit, and it had but two positions—"off" and "on."

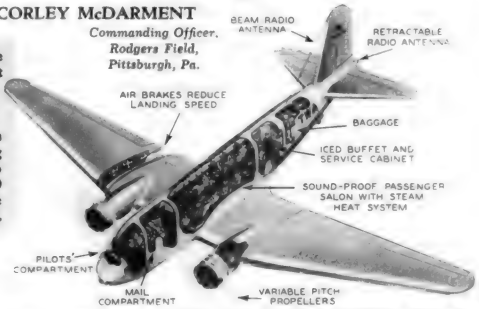
In that day of clean cockpits pilots thought

for HIGHWAYS *of the* SKIES

by **LIEUT. CORLEY McDARMENT**

Commanding Officer, Rodgers Field, Pittsburgh, Pa.

Would you like to be a transport pilot—sit at the controls of a multi-motored giant of the air carrying passengers and mail through fog and dark on radio beam highways 10,000 feet high? Here is the training you will need.



Phantom sketch of typical transcontinental airliner gives idea of roominess and comfort possible today in air travel with these "flying salons." Pilots sit far ahead of motors.

they flew by "feel." After a few of the big "feel" experts went into tail spins when taken up under hooded cockpits, this "inherent flying ability" was mentioned no more.

Today nearly every square inch of instrument board is covered with some kind of a "clock," as all gauges are called by aviators. The pilot of a big modern tri-motored plane must keep his eye peeled on forty or fifty dials inside the plane's cockpit, and at the same time watch the air traffic and check his map with the ground. If he doesn't have to check his map, he must do something harder —keep on a radio beam.

The big test of a transport pilot today comes in blind flying in fog and darkness.

[*Continued on page* 130]

In circle: Pilot and co-pilot must check these meters and levers constantly, especially when "flying blind." Air travelers enter plane exactly as they would a pullman car. Lives of these people are entrusted to transport pilot, flying over mountain and desert on radio highways.

Harness Supports Spine To Eliminate Use Of Plaster Casts

A view of the supporting harness in use. It has three points of support which prevent the slightest movement of the spine.

DESIGNED to do away with cumbersome plaster casts, a new harness made of leather and light steel is said to brace the spine perfectly from the hips to the shoulder maintaining firm rigidity in the torso of the patient.

The harness, invented and patented by Dr. John J. Nugent of Ogden, Utah, is composed of three separated braces—at the head, the shoulders, and the bottom of the spine—joined by light steel adjustable rods.

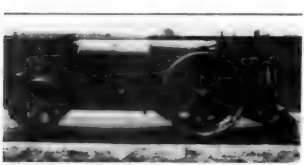
The brace at the bottom of the spine consists of a soft pad firmly held in place by a wide belt around the abdomen. The center or shoulder brace is adjusted to the proper height and fastened to a tight harness that fits the patient like a vest to hold the spine in a straight line.

The top brace consists of a rod, adjusted at the shoulders and bent over the head, which supports a soft leather harness that passes around the chin and the back of the head.

Rigid Roller Irons Road Smooth

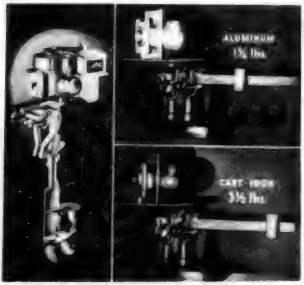
A NEW rolling machine with a third roller produces a three-point plane which gives the necessary level surface desired in the rolling of soft dirt and gravel highways.

The third roller, known as an ironer, is hydraulically controlled and can be raised or lowered to suit the demands of the operator. Since it is rigidly maintained, it cannot rise and fall in the chuck holes of the road, and pushes surplus dirt from the high spots to fill the depressions on the road surface without producing a rolling wave. The ironer has three sections set on a single shaft.



This new steam roller has an additional roller, rigidly maintained to "iron" out irregularities in the road surface.

Boat Motor Has Aluminum Pistons

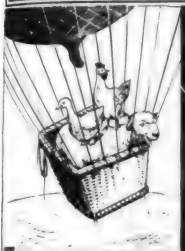


Left—One of the 1935 outboard motors with aluminum pistons and blocks. Right—Comparative weight of aluminum and iron. The aluminum casting is only half as heavy.

OUTBOARD motor building in 1935 features pistons and cylinder blocks of aluminum embodying advanced features of aviation engine design.

Using aluminum and steel materials, one of the leading motor manufacturers has produced a twin cylinder motor that weighs but 37 pounds. The aluminum pistons set in pressed iron sleeves are said to effect easier starting, longer life, and higher efficiency in engine operation.

Around the World in FIVE SECONDS; Nic Sprank in ODDITIES of Science



THE FIRST AERIAL TRAVELERS WERE A DUCK, A SHEEP, AND A ROOSTER! *In Sept., 1783, Joseph Montgolfier at Versailles, France sent a balloon up 1800 ft. Its passengers were a duck, a sheep, and a rooster.— Dubaniewicz Raz, Menasha, Wis.*

TO SAY "THE MERCURY DROPPED TO 40 BELOW ZERO" IS WRONG! — *Mercury freezes before it reaches 39 degrees below zero. Alcohol thermometers are used to record low temperatures.* James W Dayne, Manassas, Va.

A SPIDER CATCHES BIRDS! *The Mygale Spider of South America is two inches long and has feet that cover an area one foot in diameter. It catches birds for food.* —Warren Barrows, Riverside, Calif.

ADMIRAL PEARY WENT AROUND THE WORLD IN FIVE SECONDS! *Reaching the North Pole on April 6, 1909, Admiral Robert E. Peary stepped one pace from the Pole and walked eight paces in a circle around it. He completed the "journey" in five seconds, passing through all meridians to go "around the world."* — Geo. A. Goeppner, Chicago, Ill.

Nic Sprank

Win $1! Send your Oddity of Science to Nic Sprank, Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis. No Oddity will be considered unless source of proof of item is included. Do not include Oddities with letters.

Man Made Abrasive Rivals Diamond for Wearing Qualities

A steel worker pressure blasting castings with a Boron Carbide nozzle with a wearing quality 1,000 times that of an iron nozzle which was formerly used in high pressure work.

SAID to be the hardest material ever made by man—second only to the diamond in wearing quality—is the new abrasive chemically known as Boron Carbide.

Like other abrasives, it is made up in the form of wheels for cutting and grinding. Its extreme hardness makes it practical for use in wire drawing dies to replace the diamond dust formerly used, and it makes a lining for a sand blast nozzle that is estimated will increase its life to 1000 times that of the ordinary iron nozzle.

With the increasing hardness of the steels now used in modern industry, this abrasive comes as a boon to the steel worker providing ease and increased speed in cutting.

Tiny Motor Driven By Sun's Rays

A NEW "flea power" motor, developing four ten-millionths of a horsepower, operates at a maximum speed of 400 revolutions per minute propelled by the electrical energy produced from the sun's rays.

The motor has an extremely sensitive photo-electric cell of the selenium type which responds even to the rays of an incandescent lamp. The working parts of the motor are directly connected to the cells and operate on jeweled bearings to reduce friction.

Dr. C. W. Hewlett with his "flea power" motor which is driven by the impulses of sun's rays falling on a photo-electric cell to develop one ten-millionth of a horsepower.

Auto Has Separate Wheel Drive

This odd bus eliminates the usual clutches and transmission to reduce maintenance costs. Each wheel is independently driven. The motor is mounted back of the rear axle.

PRIMARILY designed for rail-coach, bus and truck work, the newest in automobiles features four independently driven wheels. Electric transmission is used. The motor attached to an electric generator, is mounted longitudinally back of the rear axle.

Machine Stimulates Hair Growth

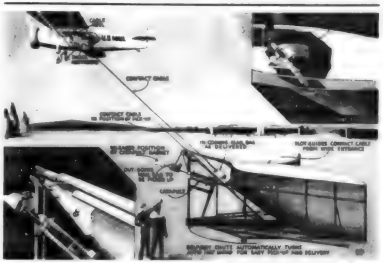
ACTING on the theory that manipulation of the scalp increases hair growth, a machine has been invented which is said to be forty times more effective than hand massage. It consists of a cap full of rubber fingers, driven by an electric motor to manipulate the scalp.

The motor rotates the rubber-finger cap to stimulate circulation. It is said to promote better hair growth and provides general scalp health more readily than hand massage.

Chicago's Airmail Pick-up Catapults Mail Bags To Planes

DRAWINGS revealing the operation of the pick-up device used at the 1934 Century of Progress in delivering and receiving mail from planes in flight have been revealed by the inventor, Dr. Lytle S. Adams of Chicago.

Most ingenious feature of the device is the method by which the incoming bag is released and the outgoing mail tossed into the air. As the plane flies directly over the chute, the comparatively fragile wire dangling from the plane is broken at the mail bag as it reaches the end of a narrowing chute in the pick-up device, releasing the bag. A steel ball on the dangling wire trips a lever which catapults a new sack out of the chute and into the air. Shock absorbers on the plane take up any jars not offset by the catapult when picking up a new bag of mail.



Millions of people at Century of Progress have wondered how Dr. Adams' airmail pick-up device worked. This sketch, released by inventor for first time, reveals details of catapult and ingenious mail-bag releasing mechanism.

New York Has Streamlined Taxis

Latest in taxicabs is this streamlined model. Fleet of 1,000 new cars have already been built for use in New York City.

READY to tour the streets and subways of New York City are 1,000 new taxicabs—a fleet displaying the most complete streamlining of any "for hire" car up to the present time, and containing a number of outstanding mechanical features.

In addition to being larger and far more comfortable than the average cab, the new taxis have a highly improved tire intended to almost completely eliminate the blow-out and flat tire nuisance. Heretofore these tires have been used on only the higher priced cars manufactured in this country. Radiator and louvre design enhance the effect of speed given the car by careful streamlining. The split windshield is another radical departure from orthodox taxi cab lines.

Slot Machine Vends 25c Sunburns

SELLING sunburns at twenty-five cents an installment, new slot machines being installed in Broadway barber and beauty shops are attracting New Yorkers seeking that Palm Beach and California complexion.

Upon depositing a coin in the slot, a violet ray lamp gives off radiations for seven minutes. Patrons are warned to wait three days before the next treatment, said too frequent usage gives painful burns.

Powerful violet ray lamp machine being installed in New York City shops delivers sun tan for seven minutes when coin is inserted. Sun-bathers sit on chair in front of device.

Above—The craftsman put a plate on this drawer but neglected to drill a keyhole. Upper right—Hand-tooled screws, nails and bolts lack the uniformity of the machine-made articles. Genuine hand-tooled bolts usually taper at points.

HOW CUSTOMS OFFICIALS

"Let the buyer beware!" Wormholes created by shotguns, machine-made "100 year old screws," file-worn chairs and green wood antiques are but a few of the tricks used by antique racketeers.

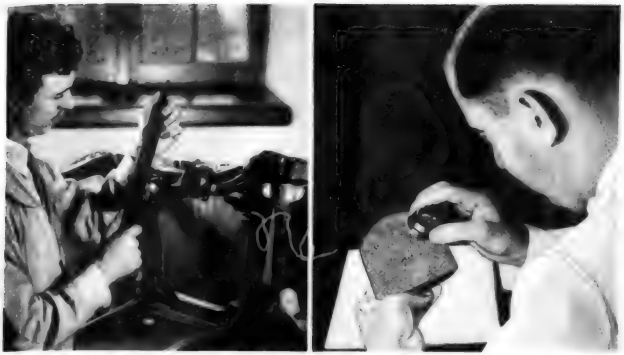
by H. H. SLAWSON

WOULD you care to buy the chair from which King Arthur directed the destinies of his "Round Table" knights—or the chest on which Mary, Queen of Scots, nervously awaited the call of the executioner?

The "originals" are for sale—hundreds of them—according to U. S. customs officials who have a back-stage insight to antique "racketeering."

The market is flooded with "rare old antiques" valued at thousands of dollars which are actually worth no more than a dollar a dozen. The adage, "Let the buyer beware!" was never more aptly applied to any business. Though they are not buyers, customs officials are wary.

An antique faker can produce holes in a second that would keep an industrious worm busy for months. He uses small bird-shot in a shotgun. Those holes are quickly detected as the edges are much too regular in shape.



The photo at the left shows a workman putting worn corners on a Chippendale chair with a file. Right—Small round dots on "old" bronzes reveal that they are electroplated. The bronzes are actually made of lead pickeled in sal ammoniac.

EXPOSE ANTIQUE FAKERS

"Our job, under the law," one customs official, who must remain anonymous, told the writer, "is two fold. If entry of the object is claimed under the free clause, we must determine if it was actually made prior to 1830. If it was it can enter duty free. If the object is dutiable, we must check its value. Disputed decisions can be settled by judicial procedure, but in the past twenty-five years a corps of expert appraisers has been organized at the nine ports of entry for antiques, and mistakes are seldom made.

Small Details Expose Fake

"Sometimes it is only necessary to remove a board or two from a crate to spot a fake. Sometimes final decision on the authenticity of the object demands the lengthy study not only of our men but of experts whom we call in from outside. Long familiarity with antiques, however, gives a man ready facility in reaching decisions.

"It is true that a genuine antique expresses its aristocracy unfailingly, though we do not rely entirely on looks.

"It is often on the inside of an alleged antique that clues to impositions are found. The antique faker, we have learned, acts just like men in other crooked lines. No matter how perfect the 'master crime' may be, there is always a slip-up. Something is overlooked and the good detective eventually spots it.

Machined Screws Not 100 Years Old

"This slip-up in the antique fakes is frequently a small detail. There was a desk in here once, exquisitely perfect in design and seemingly above question. The search for flaws got down to the keyholes and, sure enough, on two drawers the plate was in place, but the maker had forgotten to drill the holes. There was no scratch or dent or other indication that effort had ever been made to insert a key in those blind locks for more than 100 years.

"Sometimes we look for screws often found concealed beneath a plug of putty. If they are machine-made screws, it proves that the article was never produced before 1849, when such screws were first manufactured. The hand-filed screw of the early craftsmen cannot approach the uniformity of the machine-made product. They differ,

[*Continued on page* 118]

DIVING SPIDER PLANE To HURL Big BOMB

AVIATION'S newest wartime threat is rumored to be a plane, tiny enough so that a fleet of them will fit into a dirigible, which, when released, will guide huge, two-ton bombs to within a few hundred feet of their objective.

Like giant spiders clutching bottle flies, they will zoom into power dives, each carrying tons of destruction.

Fantastic? Not if recent experiments are carried to their logical ends. The use of the power dive as a means of attack is not new.

When attached to a carrier, the bomb becomes an integral part. It is released only when a direct hit is a certainty. After releasing the bomb, the plane can return to the carrier or act as a interceptor fighter.

Unable To Cut Graves In Hills; Use Skyscraper Cemeteries

Photos show the "Streets of Death" in Barcelona. Each skyscraper is divided into squares large enough to hold a coffin.

BARCELONA, the capitol of Spain, set high among the mountains buries her dead in skyscrapers on the mountain side that resemble gigantic filing cabinets.

Faced by the fact that they could not cut graves in the mountains, Barcelonians have evolved this strange system of burial. The buildings form long avenues. Each is separated into small squares the size of a coffin. Guards with ladders hang floral offerings on the doors.

New Streamlined, Steam-Propelled Bus Will Make Appearance Soon

STEAM propelled automobiles, once a familiar sight on American highways, are about to return with a new aerodynamic passenger bus, according to a statement recently issued by Harry W. Gahagan, president of the Stanley Steam Motors Corporation.

The new heavy duty bus now under construction is made to conform to the need of truck and bus drivers for performance at a minimum cost. It is claimed that the steam car will give performance equal to that of the internal combustion motor with 25 per cent of the operating costs. Steam busses, it is estimated, will double ordinary mileage and will cut repairs since steam engines have no valves, tappets, camshafts, timing gears, carburetors and ignition. Lack of engine vibrations, plus increased tire mileage due to lack of gear shifts, are other features of the proposed bus. Construction is now under way, and the bus should appear early in the spring.

The new streamlined bus is the latest in aerodynamic design with a rear mounted motor to avoid obnoxious engine odors in passenger compartment.

New Score Board Flashes Bridge Game Plays to 500 Fans

Announcer standing beside table at contract bridge contest informs operator at controls (above) of plays in game for newest of bridge scoreboards, the electrical telebridge. Operator has at fingertips switches which flash on to giant play board, shown at right, plays of bridge game.

AS CONTRACT bridge experts of Chicago and Milwaukee battled for the inter-city title recently, a telebridge electrical scoreboard flashed every detail of the bidding and play to a crowd of more than 500 enthusiasts. Spectators could follow the contests more easily than if they were standing beside the table, for all playing hands could be seen.

An announcer with microphone, standing just behind the players, informed the operator of the telebridge of each move in the game; he in turn pressed series of switches which flashed those plays on to the board. Electric lights in combination with lettered cards enable plays to be reproduced on the electrical board just as they were played at the table. Trump suit, vulnerability, tricks lost and dummy position are all shown.

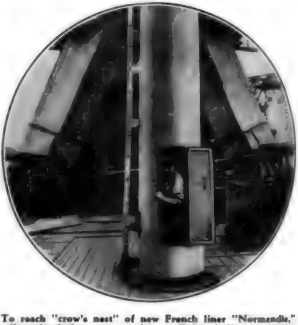
Radiator Heat Animates New Toy

HEAT from a stove or radiator operates the newest of noiseless automatic toys, a rocking horse linked by levers to an ever-turning fan blade. Hot air currents or even a slight draft of air set the windmill-like blade in motion, providing a toy motor which has no gears, springs, or weights to get out of order.

In other forms of this top-of-radiator toy there are teeter-totters, dancing men, or animated animals, all kept in motion by the convection current fan blade. Each toy is mounted on a platform to rest on the radiator as in front of a ventilator grill.

Rocking back and forth, yet never getting anywhere, this novel automatic toy gets power from fan blade turned by currents of heat from radiator. Toy has exceptionally long life.

Ride Inside Mast of "Normandie"



To reach "crow's nest" of new French liner "Normandie," sailors simply have to open door, walk into hollow steel mast, and be hauled to top in comfort by electrically operated hoist.

INSTEAD of scrambling up the shrouds to reach the "crow's nest" of the "Normandie," sailors on this vessel simply walk into the hollow steel mast, sit down in a sort of bosun's chair, press a button, and ride in comfort to the observation platform.

The tubular mast is just one of the many features of this French passenger liner, largest ship afloat. She will soon be ready for trans-Atlantic service in competition with the 1,018 ft. long "Queen Mary," now being outfitted at Clydebank, England.

Fish Leap to Eat from Man's Hand

Left—Hugo Vogt is shown kneeling on his dock coaxing a five-pound bass, one of his star boarders, to jump out of the water. Right—An action photo of a gamey northern pike breaking through the water to take a frog from Vogt's hand.

HUGO VOGT, Minnesota angler, has succeeded in taming game fish to the point where they will eat out of his hands.

Beneath the Vogt Long Lake dock, idly waving their tails against the mossy piers, lay many wily nothern pike, pan-sized sunfish, and large mouth bass waiting for the tasty morsels that Hugo passes them at regular intervals during the day. Bass and pike will leap two feet out of the water for a frog.

Hugo first became acquainted with his fish when washing sheets in the lake. The fish, attracted by the color, came in, and Hugo tamed them by throwing them bits of food. He trains them against anglers by casting wooden plugs to them without hooks.

Pickup Tool Grasps, Inserts Bolts

A NEW tool has been designed for picking up and inserting bolts, screws or other small objects in places too small for the hand to operate. The tool consists of four fingers operated by a plunger within a tube. When pressure is applied, the fingers open; when it is released, they grasp the desired object.

The four grasping fingers of this pickup tool open when pressure is applied to the end of the plunger.

Machine Makes Instant Ice Cream

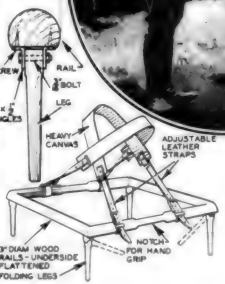
Demonstrating the quick action freezer. The liquid is poured in and sprayed on cold cylindar walls to freeze in 40 seconds. It is then shaved off with a cutter knife.

USING a new style freezer, freshly made ice cream can be produced in 40 seconds and delivered to a waiting customer.

The ingredients of the dish, after mixing are poured into the top of the machine where they are broken into a fine spray by an atomizer rotating at the speed of 3,000 turns per minute. The spray is thrown against the cylinder wall, which is maintained at a low temperature, where it freezes instantly.

Ancient Falconry

Hawking, 3,000 year old sport of kings, is being revived. How hawks are trained to hunt birds and small game is revealed here.



Above is a rack for carrying hooded hawks to the field. The birds are held in position by light chains or thongs. At left are details for building the rack. Upper left — the hawk has killed a pheasant. Drawings at left show stages in capturing and training the young hawks for hunting in the field.

THE ancient, colorful, and very exciting sport of falconry, too long neglected by American hobbyists and gamesmen, is being revived in this country, and the jingle of falcons' bells are again heard over many a field and wood as the swift and predatory bird swoops down upon its prey.

Falconry is one of the oldest ways of getting a full gamebag. The falcon, properly trained and subordinated to human will, is a serviceable hunter—especially keen for ducks, grouse, and other game-birds. No winged creature can escape him. The mallard and green-winged teal, both of whom boast a speed approximating 90 miles an hour, are veritable slow-coaches compared with the falcon, who overtakes them with a zooming burst of speed, knocks the fight out of them with one rap of his

AMPFIRE is NEWEST HUNTING Sport

by HENRY MORTON ROBINSON

Above—Hawk hooded with thongs fastened to legs. Drawing at right shows how to make hood and jesses. Boy in upper right holds hawk on gloved hand before releasing to swoop into air after birds or small game. Drawings at right show late stages of hawk training. Pigeon wings attached to fresh meat act as lure.

yellow claws, and then circles down to lay his offering at the feet of his master.

Quite apart from the thrill of taking game with a falcon, the pleasure of capturing and training this "scimitar of the air" is one of the most engaging of leisure-hour pursuits. Falconry is the ideal hobby for the calm-tempered man who loves birds and has plenty of time and patience to get the best out of them. It is not an easy task to train a falcon and I do not advise edgy, irritable persons to go in for it.

The falcon, in spite of his fine name, is really a hawk. Hawks will not breed in captivity. Therefore you must capture your own hawk and you must take a hawk when he is a mere chick.

The best place to look for a hawk's nest is on a mountainous cliff-side or a rocky eminence overhanging a deep ravine. The bird you are seeking is commonly known as

[*Continued on page* 124]

SPORTSMEN'S

Catch DANCING FISH Without Tackle or Net

Above — With the grunion due to spawn, hungry birds anticipate a feast of plenty.

Above—A promising cove which appears ideal for the grunion spawn. Center — A fisherman drags a scoop-net, made of screening, through the breakers in search of the grunion. Left—The grunion fish, which performs weird dances on the sandy beach, is a short game fish with a green back, silver underpart, and a blue stripe lengthwise on the sides.

ANNUALLY, thousands of people gather on California beaches to watch, with the aid of artificial light, the antics of the silver bellied grunion fish as they emerge from the sea to perform a frolicsome dance on the sand to the rhythm of the pounding surf.

Sportsmen formerly caught the grunion with nets as the gamey little fish came ashore to spawn. The resulting threat of extermination then put the grunion in a class by himself. As a result of game regulations the grunion is the only fish which must be taken with the bare hands without the aid of tackle or nets.

Just before high tide, the grunion collect in the surf and allow themselves to be stranded by the high waves. The female then digs a hole in the sand with her tail and lays her eggs to be fertilized by the male. The next high tide carries the fish to sea.

Selecting a DOG for Your Favorite Sport

by ROBERT PAGE LINCOLN—*Hunting and Fishing Editor*

THE difference between the trailing dog or hound and the gun dog is that the one follows the trail of an animal by its scent and brings it around to the hunter, while the pointer operates at close range to the hunter and freezes to a point when it scents game. In the latter division are found the setter and the pointer, until a few years ago the most commonly used of all hunting dogs. The trailing hounds belong to another group the foremost of which are the beagle, the coon hound, and the foxhound—in England, the Basset, the stag, and the otter-hounds.

A good trailing hound is valuable if it will trail only the animal for which it is intended. The beagle will follow a rabbit and will not veer off onto another trail; the coon hound will never leave a coon spoor.

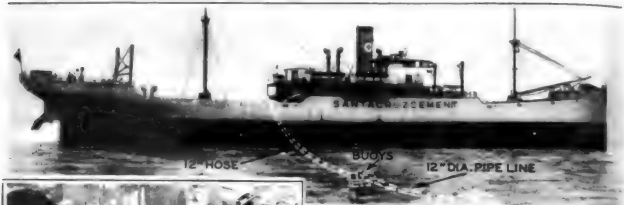
There is also the spaniel, a breed of dog that has had a phenomenal rise in this country. The two spaniels most in use here are the springer and the cocker. Of these two, the springers are the most popular as they are exceptionally good water retrievers and active, tireless hunters. Both spaniels make excellent home dogs, possessing mild, playful natures.

The rise of the pheasant in the country as a game bird has created a demand for a pheasant dog—a dog that will flush a pheasant rather than point him. Here, too, the spaniel has come to the fore.

The Irish spaniel is recognised as the foremost water retriever, but where not used in a boat, the strong, hardy Chesapeakes and Labrador are replacing them. Their short fur also adapts them for field use.

Above—A golden-springer proves his worth as a pheasant dog. Springers make especially good pheasant dogs, as they flush the bird rather than let him run away. Right—Lady, an Irish setter rests after retrieving a crippled pheasant.

Long Pipe Line Carries Bulk Cement to Ocean Freighters



Above photo shows a bulk cement freighter ready for loading. A 12-inch pipe line is floated 2,500 feet to the ship on buoys which support the line over the water's surface.

Men on the vessel preparing the filling pipes to receive the rubber hose which is connected to the pipe line from shore.

UTILIZING the peculiar tendency of dry cement to become fluent or "flood" when mixed with air, a Davenport, Calif., cement company is now loading bulk cement into ships at the rate of 1,000 barrels per hour through a twelve-inch pipe extending 2,500 feet out over the ocean.

The cement is delivered from the plant into four huge concrete silos and from there enters the hoppers of the cement pump by gravity. From here it is forced forward by a rapidly rotating impeller screw into the barrel where it is expanded by air, becoming so fluent that it is easily forced through the line by the screw.

Cigarette Maker Fits Vest Pocket

A TINY, vest pocket cigarette maker, weighing only ¾ of an ounce is the smallest device of its kind ever invented and is said to be mechanically perfect.

In rolling a cigarette, the desired amount of tobacco is placed in a cloth between two rollers. The paper is placed in a slot, and the fingers of the right hand are used to turn the roller knob while the thumb of the left hand governs the tensity of packing.

The vest pocket cigarette maker is ⅝ inches thick and 3 inches long.

Razor Edged Tool Cuts Carton Tops

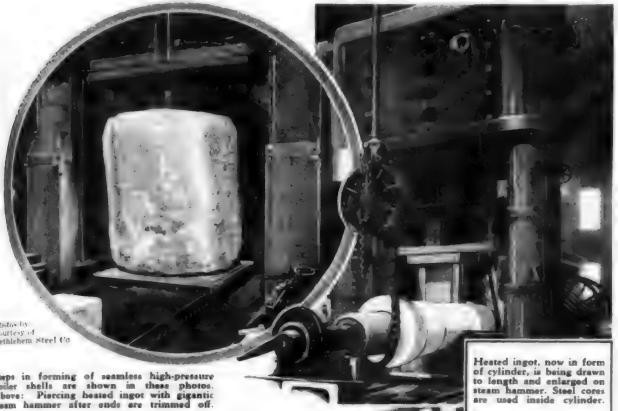
A HAND fitting handle and a detachable razor cutting blade have been combined to form a carton opener that will easily shear the heaviest cardboard without fear of damaging the contents.

The razor edge of the cutter is set to avoid cutting carton's contents.

Students Get Coffee From Bananas

RECENT experiments at the Hawkesbury, Australia Agricultural College reveal that "coffee' can be obtained from bananas. These results were obtained by peeling the fruit and dehydrating it. Doctors are interested in the product as a nutriment for building up children.

How Giant Hammers Forge Seamless Boilers



Photos by Courtesy of Bethlehem Steel Co

Steps in forming of seamless high-pressure boiler shells are shown in these photos. Above: Piercing heated ingot with gigantic steam hammer after ends are trimmed off.

Heated ingot, now in form of cylinder, is being drawn to length and enlarged on steam hammer. Steel cores are used inside cylinder.

IN ONE of industry's most spectacular operations, the forging of seamless steel boilers, giant hydraulic presses squeeze and stretch white-hot 200-ton ingots into 60-foot cylinders of steel, 4 feet in diameter, and with walls over 5 inches thick. Powerful lathes turn off tons of metal in bringing the tube down to size. Heavy boring tools remove irregularities on the inner surface.

High pressure boiler drums made from a single ingot have no joints at which leaks might start. These boilers are used extensively in steam power plants, where they withstand steam pressures as high as 1840 lbs. per square inch.

Forged cylinder is machined inside and out before ends are closed in by final forging process. Lathe used is one of the largest in the world.

After testing completed boiler with water under high pressure, flue holes are bored through 5-inch thick metal walls with powerful electric drills. Inspection manholes are left in each end of completed boiler.

"PLAYER PIANO" ROLL Controls Sky Sign

In circle—"Player piano" roll which controls lights forming letters. Sign can display continuous message of 75 words.

USING a musical siren to gain attention, a new sky sign, designed by Edward Link, Cortland, New York, aeronautical engineer, after five years of experimental work, took to the air for the first time over Miami this winter.

The sign, constructed as a lower wing to a high wing monoplane, is operated from an automatic "feeler" roll. It can display ten letters at one time, using as many as 75 words per message.

Light squares of ten by six inch Dural strip are hung four feet below the mono-wing on a Dural rack. Each square contains 300 lights, so wired that the control mechanism, operated from inside, delivers to each square any letter or numeral desired.

The operating mechanism consists of a rotating roller on which is placed a roll of heavy paper with perforations through which the feeler pins make contact. Each feeler pin controls a letter or numeral. Due to a perforation machine, messages can be changed while flying.

Tiny Ford Has 10 Horsepower

A RISE to ten horsepower over the previous "Baby Eight" is one of the leading features of the new four-cylinder British-made Ford recently on exhibit at the Albert Hall motor show in London.

The new motor, following the modern trend, has a three-point rubber suspension. Body space is increased by pushing the engine farther forward and increasing the overall length of the chassis one inch. The chassis, just as in the "Baby Eight," is mounted over a 90-inch wheelbase with a 45-inch-tread. It has one-eighth the power of the American Ford.

A de-luxe British Ford roadster containing a four cylinder motor which develops ten horsepower—one-eighth the power of the American Ford.

Asbestos Blanket Thrown Over Blaze Smothers Auto Fire

TO EXTINGUISH automobile fires a new asbestos blanket, demonstrated in England, is simply thrown over a blaze.

The blanket is composed of a cloth-like asbestos and is made large enough so that it will cover a good sized blaze. The principle involved is that fire cannot burn without oxygen. Carbon dioxide forms under the covering and smothers the fire. The blanket can be folded and carried under the driver's seat, but may be used as a warming robe during cold weather.

Photo shows how auto fires are extinguished merely by throwing these fire proof asbestos blankets over the flames.

Camp Stove Has Barbecue Spit

Photo shows the varied uses of stove—baking potatoes and biscuits, frying potatoes, and barbecuing at the same time.

FOLDING flat so that is occupies but little space when not in use, a new camp stove roasts, broils, bakes, or barbecues, using a bed of coals to supply the heat.

The stove is composed of sheet metal, hinged for folding. It contains two racks for baking and broiling and a spit, controlled by a handle outside, for barbecuing. The racks may be interchanged for use as a storage cupboard when the stove is not needed for cooking.

Gunboats To Fight Shark Menace

THE gunboats and seaplanes of three nations, England, Holland and Portugal, will soon combine in an attempt to drive dangerous tiger-sharks from their breeding grounds near the Island of Timor. The main weapons used will be torpedos dropped from circling planes and depth bombs released from the gunboats.

Build Big Grinder For Telescope

PETTED and pampered like a one-year-old child, an entire building, airtight and impervious to temperature change, was erected especially to house the huge—yet delicate—mechanism designed to grind and polish the new 200-inch telescope mirror poured recently at a Corning, N. Y., glass works.

Using carborundum for grinding and rouge for polishing, the gigantic machine is now at work on a 120-inch mirror, a test project to determine if it is humanly possible to handle the casting and finishing of the 200-inch lens for the Palomar observatory near San Diego, California.

The giant grinding mechanism at work on a 120-inch mirror, a test preceding an attempt to handle the 200-inch mirror.

Amateurs Race Professionals In Rock Drilling Contest

Several of the racing crews gathered on the platform after the race. The winners drilled through the rock, 5½ feet, in five minutes and 38 seconds.

ROCK drilling came to the front as a new American competitive sport with amateurs giving professionals an amazingly close run due to the perfection of the machinery. Accompanied by the encouraging cheers of the crowd, several fast drilling crews pounded their way five-and one-half feet through a granite rock at a Miner's Day celebration held recently at Indio, California.

Prizes of $500, $300 and $200 were offered to the winners with the team of Carlson and Hanovich taking first money in the record time of 5 minutes and 38 seconds.

At the judges whistle, contestants snatched their tools, mounted the platform, inserted the steel, made air and water connections, and began drilling.

It is interesting to note that non-professional drillers set amazingly high scores. Drilling machinery has reached such a state of perfection that a mine, now being sunk in Honduras, employs only native drillers, none of whom have seen the machinery previous to the time they were hired.

New Reflector Aids Shaving

NEW reflecting mirrors which can be set to throw light upward are designed especially for use in shaving to reflect the overhead light and illumine the shadows under the user's chin.

The reflectors are constructed of light metal jointed at the head and base. Folded, they are easily packed for traveling. They are ideal for dressing tables and can be used to reflect light on all types of fine work.

If a soft light is needed on the baby's crib, it can be obtained by setting the mirror to reflect the night light.

The reflectors, fastened to the wall, reflect the overhead light to eliminate bothersome shadows under the shaver's chin.

Double Goggles Work On Hinges

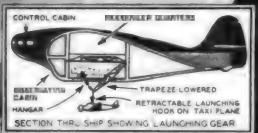
A NEW goggle has hinged dark glasses, for use in welding, which raise to reveal clear glasses for use in chipping, grinding, flattening, forming and other types of work hazardous to the eyes.

The goggles, fastened to hinge, can be raised to inspect work.

New Device Helps Piano Tuners

A MAN with the sharpest ear in the world cannot tune a piano perfectly due to the minute differences in sound frequencies. It is expected, however, that new electro-acoustic tools recently invented will correct this fault and open wider fields for players and composers. Such inventions would have appealed to Beethoven who often used notes not included on piano keyboards.

TAXI PLANE Picks Up FREIGHT And Passengers for AIRLINER



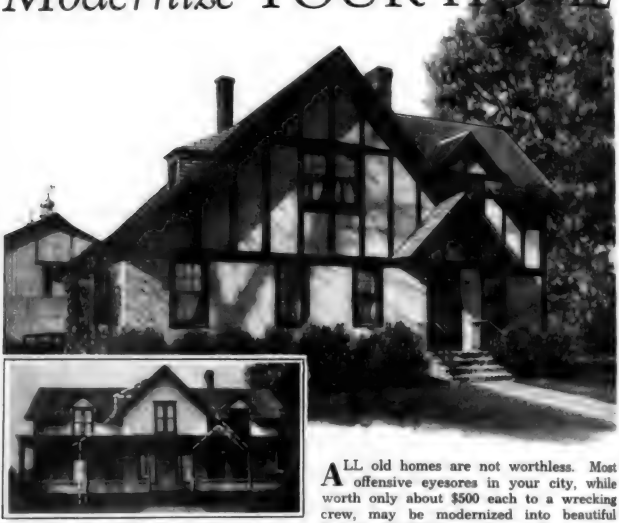
SECTION THRU SHIP SHOWING LAUNCHING GEAR.

INTERIOR VIEW SHOWING THE RETURNING TAXI PLANE RE-HOOKING TO GIANT AIRLINER

HIGH speed taxi planes that can come and go from a giant "mother" air transport at will are proposed as a means of providing fast, non-stop transcontinental air service. The smaller ship, released over a city, would land at the airport to discharge and take on passengers and freight, then soar upwards again to catch up with the slower airliner.

As may be seen from the sketches, the method of launching the taxi plane is very similar to that used by the U. S. Navy in handling pursuit planes on dirigibles. A trapeze crane lifts the small ship into the hull of the transport, where passengers may be transferred to roomy quarters on the airliner.

Modernize YOUR HOME



Above—A rambling old farmhouse before and after remodeling. A sweeping roof smoothens out ungainly lines. Dotted lines indicate how the changes were accomplished.

Dotted lines show the improvements necessary on this old home. Note long roof, window, and square open porch.

ALL old homes are not worthless. Most offensive eyesores in your city, while worth only about $500 each to a wrecking crew, may be modernized into beautiful homes with little expenditure. Perhaps the siding is rotten and weatherbeaten but it may be fastened to a superstructure that is sound and will give years of service. A new sweeping roof replacing an ugly gable, a window in a blank wall, a coat of stucco over an old wall, or a modern porch to replace the old veranda are but a few methods used by architects in making old homes presentable.

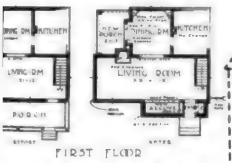
Location means a great deal when considering the advisability of modernizing. Approximately $9,000.00 is being spent on a house in a Minneapolis suburb originally costing but $4,000.00 because of its excellent location and its sound structural condition. Under the circumstances, this step is wise, but had the same structure stood in a poor locality, even half this remodeling expenditure would be very foolish indeed. Some years ago another property—a nice corner location—was remodeled at a cost exceeding $10,000.00. This location remains today, one of the nicest in the city.

When contemplated changes are major

at SMALL COST

by D. J. C. Parsons
Registered Architect

Lower right—A semi-bungalow before remodeling. Above—The same bungalow rebuilt into an English type house by adding a front gable, a side addition, shingling the sides, and putting stone work on the "first floor front." The change brought a larger living room, a coat closet, a private porch, a sleeping porch, and a distinctive home exterior for $3,375.



Left—The original plans for the bungalow at right. Right—The first floor plan after remodeling was finished. Black lines represent old walls, grey lines, new ones.

ones, a new porch, an enlarged entrance, additional rooms, conversion of a single family house into a duplex, or turning a single story into a two story house, it will pay the owner to engage an architect. Remodeling requires even more thought and care than does new building. Changes that may seem feasible to the owner are frequently impossible on the job. The study of the situation by one experienced in design and construction may result in a much better, more economical solution than the owner had anticipated.

If it is true that "one good picture is worth 10,000 words," then we will help to visualize the possibilities of home modernization by showing samples of actual remodeling jobs. Figures No. 1 and No. 2, believe it or not, are the same premises. The house originally a semi-bungalow built about 20 years ago, is located in a good residential district with some new and some old homes surrounding it. The owner desired to obtain a larger living room with fireplace, a coat closet, a more privately located porch, a sleeping porch, and a more distinctive exterior.

[*Continued on page 122*]

Carry Out Sailing Maneuvers On Land With Pivoted Boat

Delicately balanced on a pivoted frame, this sailboat gives training in nautical maneuvers to aspirants for yachting fame, without dangers accompanying first sailing cruise on water.

SWINGING, pivoting, and rolling to the dictates of her master, a training sailboat invented by a yacht builder handles as smoothly on land as would the same type of boat on water.

Originally intended as a safe yet efficient way of introducing to his grandson the fine points of sailing, the full-size, accurately constructed boat is being used today even by old hands at the game, in trying out new tactics. So carefully balanced is the boat upon the pivoting stand that she will respond to the slightest change in wind or sail position.

With such an arrangement, anyone can take a training course as a skipper without ever leaving his own back yard. According to the builder, any small sailboat may be rigged up in this manner for land training.

Pocket Mirror Has Folding Stand

FROM Germany comes this pocket mirror with an ingeniously designed folding stand. Closed the mirror and stand combined is no thicker than an ordinary lead pencil; open, it has about the same height as the pencil.

The mirror is mounted on a folding extension arm in such a way that it can be set at any desired angle. The metal cover over the folded mirror serves in the open position as a base or stand.

New German folding pocket mirror, compared in size to lead pencil. Lazy tongs form stand.

The mirror is especially designed for travelers, since it eliminates the necessity of carrying a regular shaving stand, and permits use of both hands.

Revolving Shades Fit Tiny Bulbs

SCINTILLATING jewel effects are given with unique revolving light shades made for small electric bulbs. A cone of wire snaps over the bulb, with a sharpened tip projecting at the top. An inverted glass cone on the shade balances delicately upon this point. Heated air, hitting vanes inside the shade, produces the rotation once the shade has been started by hand.

Tiny revolving lamp shade clips over any small electric bulb, gives scintillating effect when turning.

Rubber Lamp Cord "Zips" Open

BOTH conductors of a new ultra-safe lamp cord for household use are encased in a single rubber sheath which can be separated like a "zipper" fastening when connections are made to a wall plug. Cotton tape separates the wires.

Cotton tape between wires of new rubber lamp cord permits separation of wires in "zipper" fashion.

New POWER *For Mechanical* TOYS *Opens Large* FIELD *For Alert* INVENTIVE *Minds*

Millions of dollars can be made by catering to the whims of children. Secure advice on protecting or selling your idea by writing the Patent Editor, *Modern Mechanix and Inventions*, 529 S. 7th St., Minneapolis, Minnesota.

COUNTLESS inventors have rolled up tremendous fortunes by the development of new and simple toys as the several hundred manufacturers in this industry are ever in need of fresh attractions. Indeed, at the present time, there is an urgent cry for new material, and consequently we shall devote this month's department to an outline of some of the more pressing problems. Toys can be developed by any man without an elaborate work shop since most of them are made of bits of wood and cardboard. Some of the biggest money makers on record have been perfected with little more than a jack knife.

Investigation of the toy industry brings out one incontrovertible fact concerning the popularity of the various mechanical toys intended for boys; in the old days it was the toy boat and the toy train that attracted a boy. Today it is the toy airplane. Anything new along this line that can be sold to boys will be snapped up quickly at high royalty. Manufacturers, for instance, are still looking for the self-powered airplane that will fly without the use of rubber bands. A real miniature power plant is needed; something that will drive a toy ship a long distance without running down. Naturally the motor cannot be expensive because of the danger of crashing and because the average boy cannot afford an elaborate machine. Such a motor may bring $50,000 royalty the first year.

Several manufacturers dealing in wood products and toys are waiting for a system of wooden blocks that will take the place of metal construction toys—an interlocking system of blocks that will permit a youngster to set up solid buildings.

Speaking of toys used for construction, it should be kept in mind that the manufacturers dealing in wire forms are also on the lookout for a method of clipping wire lengths

[*Continued on page* 142]

Advertising Emblems Glow Weirdly In Cathode Ray Tubes

Advertising emblems sealed into these cathode ray tubes glow weirdly under electron bombardment. Gilbert T. Schmidling (pictured above) builds these tubes for store window display. High voltage transformers are needed here.

IN ONE of the most unusual of modern forms of advertising, trademarks mounted at the anode position of giant cathode ray tubes are painted in cold light of great brilliancy and dazzling color by electronic bombardment. Displayed in store windows, the tubes demonstrate to shoppers one of the many feats of the electronic tube, and at the same time display a business emblem.

Gilbert T. Schmidling, inventor of the first true cold light, coats these emblems with different chemicals, each giving off a certain color of cold light under electronic bombardment. Over 400 different shades, all of great brilliancy, have already been produced. Any number of colors may be obtained in one tube by using the different chemicals.

Any Truck Can Push This Sweeper

SWEEPING of streets at a speed of ten miles an hour is possible with the newest of rotary brooms. The entire sweeping assembly may be attached or taken off in twenty minutes, making the motor truck available for other purposes.

The rotating brush is directly coupled to the front end of the engine crankshaft, through a clutch controlled from the truck cab. The operator may also lower or raise the brush while the truck is in motion. Dust is thrown to one side.

Rotary broom, driven directly by truck engine, sweeps streets at 10 m.p.h. speed. Water contained in tank is sprayed automatically to settle dust as sweeper moves along city streets.

Movie Camera Is Also Projector

Combined home movie camera and projector has built in batteries which will operate film motor long enough to show 50 reels. When projecting, battery supplies power to bulb.

FILMS may be projected as well as taken with a midget home movie camera marketed recently for amateur use. A tiny but powerful electric motor operated by four flashlight cells drives the film during exposure, and supplies power for the projector bulb. The film used is 9½ mm. wide, but has a picture area about the same as that of 16 mm. film, since perforations are in the center between the frames. The camera has a fast f 2.5 lens, giving usually clear pictures.

Headphone With Built-In Crystal Set Gets Local Programs

SNAP one lead of this headphone radio receiver to a ground pipe, push the other into a convenient electric socket, and enjoy the programs of your local broadcasting station.

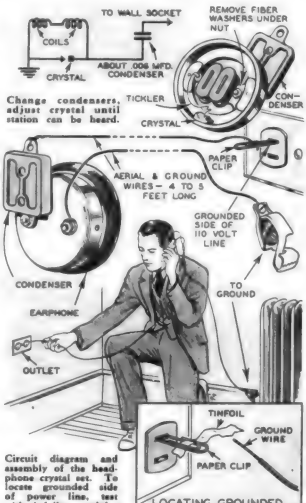
This complete crystal radio receiver is easily built into an ordinary headphone; though only one station can be received with a given set of parts, this station may be changed by varying the value of the external fixed condenser.

Assemble the set as shown in the sketches. Use liquid solder in mounting the crystal, or a standard crystal holder, since any heat will damage sensitivity. Remove the insulating washers from the indicated phone terminal, to ground one end of the coil to the frame.

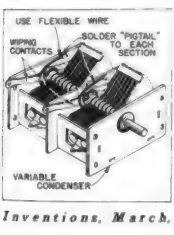
The grounded side of your house power line is used as aerial, and a radiator or water pipe as ground. Better results will of course be obtained with a regular outdoor antenna.

Cover and diaphragm must of course be removed when first adjusting the crystal. Once a sensitive spot is found, a few taps will often reset the catwhisker.

The set may be permanently connected to aerial and ground without damage—programs will then be ready for you each time you lift up the phone. If a headband is used to hold the set, do not attach other phone, the other phone should be left in, but not attached.



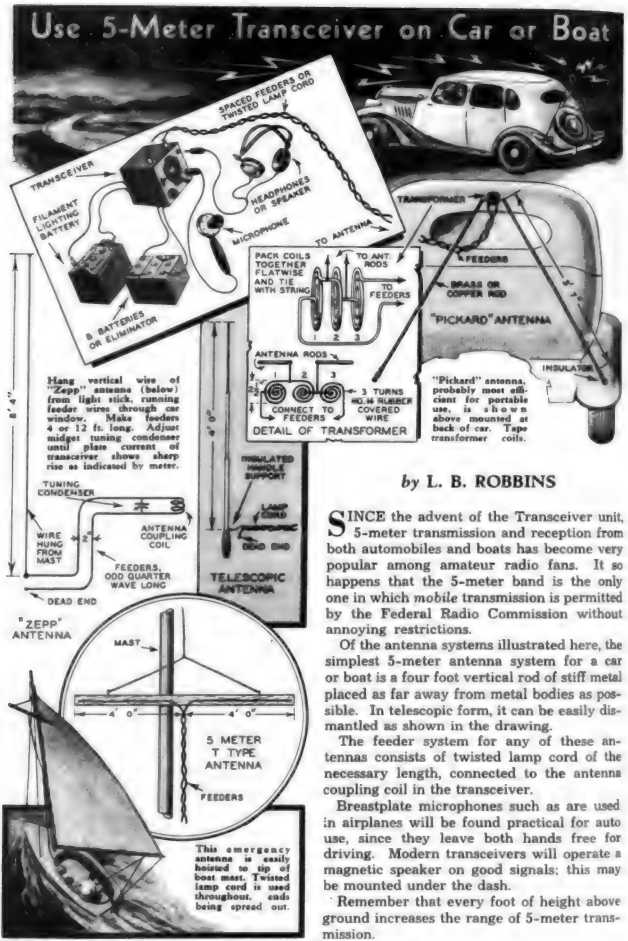
Circuit diagram and assembly of the headphone crystal set. To locate grounded side of power line, test with tinfoil as at right. Foil will not melt when clip is at ground point.



"Pigtail" Leads Stop Tuning Condenser Noises

THE wiping contacts connecting the rotors of variable tuning condensers to the frame often become dirty, producing harsh noises and sometimes oscillation when tuning from station to station. One way to cure this trouble is to solder flexible wire or "pigtail" leads from the condenser frame to the rotor, bridging the wiping contact. In gang tuning condensers it is important to do this to each section. Leave the old contacts in place, as they provide proper tension and keep the plates properly spaced.

Use 5-Meter Transceiver on Car or Boat



by L. B. ROBBINS

SINCE the advent of the Transceiver unit, 5-meter transmission and reception from both automobiles and boats has become very popular among amateur radio fans. It so happens that the 5-meter band is the only one in which *mobile* transmission is permitted by the Federal Radio Commission without annoying restrictions.

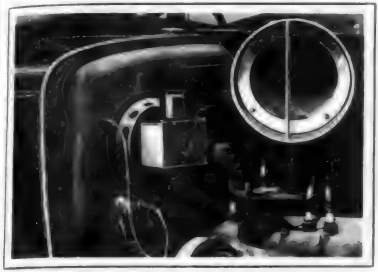
Of the antenna systems illustrated here, the simplest 5-meter antenna system for a car or boat is a four foot vertical rod of stiff metal placed as far away from metal bodies as possible. In telescopic form, it can be easily dismantled as shown in the drawing.

The feeder system for any of these antennas consists of twisted lamp cord of the necessary length, connected to the antenna coupling coil in the transceiver.

Breastplate microphones such as are used in airplanes will be found practical for auto use, since they leave both hands free for driving. Modern transceivers will operate a magnetic speaker on good signals; this may be mounted under the dash.

Remember that every foot of height above ground increases the range of 5-meter transmission.

Car Dash Panel Is Baffle Board for Radio Loud Speaker



Photos show front and back of auto radio speaker mounted to use dash panel as baffle board. Grill goes on inside of car, over hole cut in dash.

MOUNTING the speaker of a car radio on the engine side of the dash panel allows more room inside the car, and at the same time provides a large baffle board for the speaker itself, greatly improving tone quality.

First cut a hole in the dash about 1" less in diameter than the speaker. Remove the screen or grill, then bolt the speaker solidly in place on the engine side. Replace the speaker grill on the other side of the dash panel, either by gluing or bolting it in position.

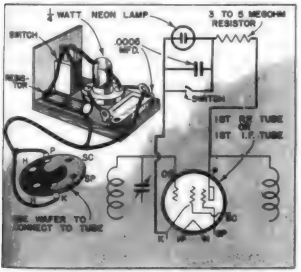
In cutting the large hole in the hard steel panel, drill a series of holes as close together as possible around the circumference, using a power drill, then cut out the disc with a cold chisel.

Low note response of the speaker will be greatly improved by this improvised baffle board arrangement.

Neon Lamp Acts As Station Finder

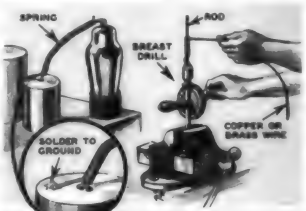
THIS neon lamp tuning indicator will prove a valuable aid in locating foreign stations on all-wave radio receivers not having a beat oscillator. The indicator produces a faint hum in the loudspeaker continually; when a station is found the hum will become much louder. The hum can be eliminated by disconnecting the neon lamp, once the station has been accurately tuned in.

The small neon glow lamp is connected across cathode and plate of either the first R. F. or the first I. F. tube in the receiver, as indicated in the sketches.



Circuit diagram and suggested assembly of neon lamp tuning indicator. Use wafer made from fiber discs to connect to set, after getting proper tube connections from tube manual.

Shield Leads With Wire Springs



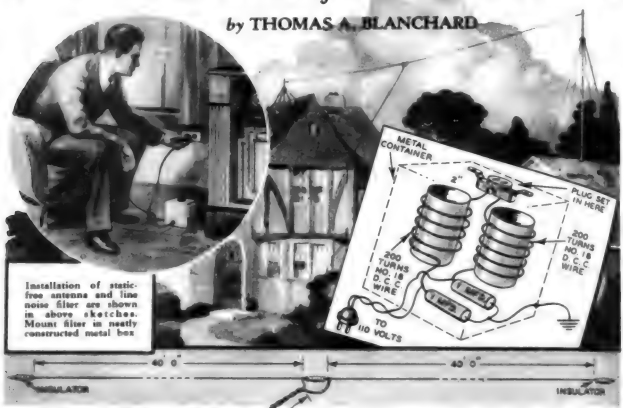
Here is simple way to wind springs for shielding leads. Ground both ends of spring by soldering to chassis or slipping under convenient bolt on chassis of radio set.

IN SHIELDING wire leads for radio work, coil springs offer many advantages over common metal braiding. Since they can easily be wound to any desired length and diameter, capacity effects can be eliminated where necessary. The springs are easy to slip over soft wires, and will support the leads.

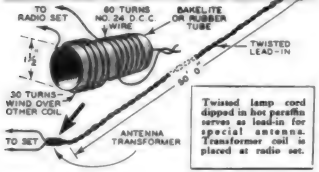
The spring is made by coiling brass or copper wire on a rod of the correct diameter.

Filter Out STATIC from Radio Antenna

by THOMAS A. BLANCHARD



Installation of static-free antenna and line noise filter are shown in above sketches. Mount filter in neatly constructed metal box



Twisted lamp cord dipped in hot paraffin serves as lead-in for special antenna. Transformer coil is placed at radio set.

Keep antenna high as possible, well-insulated at every point. To match antenna perfectly to receiver, wind antenna transformer coils side by side, add 10 turns to small coil, and use pair of sliding arm contacts to change turns.

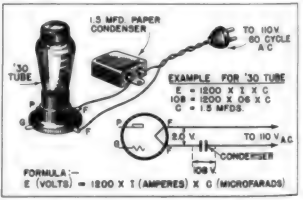
MAN-MADE radio static, entering your radio receiver either through the antenna or by way of the power line, is not at all difficult to stop. A special antenna designed to pick up only signals within the frequency range of broadcast stations will cut out interference developed by motors, telephone dials, and other electrical devices.

A capacity-inductance filter in the power line running to the receiver will stop unwanted electrical disturbances from that source. While it is as yet impossible to stop all natural static, it is generally man-made static which gives the most trouble.

The line filter, consisting of two coils each in series with a power line lead, and two condensers in series across the line, with their midpoint grounded to the metal case and to a water pipe, is plugged into a base receptacle.

Condenser Reduces A. C. Voltage

IN THE same manner as resistors are used to reduce direct current voltages for radio tube filaments, filter condensers can be used to reduce A. C. line voltages to the correct values for radio tube filaments. A voltmeter should always be used to check the voltage at the filament. Smaller condensers can be connected in parallel to accurately adjust this voltage, since the exact condenser called for by the equation will seldom be available.



Formula gives condenser size C in microfarads needed to pass given current I and drop voltage required amount E.

Matching Wits With Match-Stick Tricks

MAGNETIC MATCHES cling to each other when pressed together, defying laws of gravity, yet appear same as ordinary matches. Match sticks are first soaked in boiling hot paraffin.

THE LEAPING FLAME never fails to amaze party guests. Match sticks are first soaked in hot paraffin. Two are lighted and held one above the other in the position shown above. Now, if the bottom match is blown out, it will smolder for a second, then burst into flame again in a mystifying manner. Flame travels down gas column.

BALANCING A MATCH on end is not so easy a stunt to do—unless you know how. Performer here balances match easily on top of box held in hand, yet audience fail every time they try. Secret lies in thumbtack inside cover, with sharp point protruding just enough through top to catch into end of match stick. File down thumbtack to needle point.

TRAINED MATCH BOX always lands top side up when tossed on table by performer, while other boxes average "tops up" only 50% of time. Half dollar placed between drawer and outer cover, pushed into center where it will not be visible, is secret of trick. Added weight at bottom of box brings it into position when spinning in air. Noise made by loose matches in box will hide coin thump.

COLORED FLAME MATCHES should make a hit with patriotic audiences, for the three colors of the American flag may be obtained from the same box of matches. Performer can get matches to burn in red, white, or blue, whichever audience may call for. In this case the match bodies (not the heads) are soaked either in strontium salt solution to give red flame, potassium salt for white flame, and lithium salt solution for blue flame. By cutting matches to slightly different lengths, performer may produce whichever color is called for. Differences in length are more readily noted if box is tipped so all slide to one end. Shake box before allowing spectators to examine it.

IDEAS *for Amateur Stage*

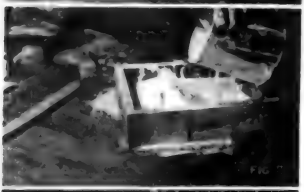
STAGE properties, the stumbling block of most amateur theatrical producers, are not as difficult to construct as they appear. One does not have to be a woodsman to produce a tree; nor must he go to a quarry to get rocks. Actuality is nice, but deception is much more convenient.

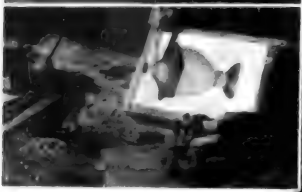
Papier mache is the material most used in stage properties. Used properly, it makes properties not only realistic, but also light enough for quick handling.

Most papier mache props are simply made. A tree, for instance, can be made in a few hours.

All of the pieces are built of 1″ Idaho white pine in various widths. Number 2 stock is good enough. If the lumber is reasonably clear of knots, number 3 may be used.

The tree may be made of any size desirable, but we are assuming that this one is 2′ in diameter at the base and 12′ high. Make four circles as shown in the drawing of 6″ stock, fastening them together with cleats of 1″x2″ stock. Use 1½″ No. 8 screws to fasten your cleats. If your bottom circle is 2′ in diameter, your top one should be 1′ 6″ in diameter, the second one from the bottom 1′ 10″, and the remaining one 1′ 8″. Fasten them together as shown in Fig. V with 10 pieces of 3″ stock 12′ long. Use 8 penny box nails for this job. The rear portion of the tree's circumference (approximately one fourth) should be left open to give an opportunity for bracing the tree to the stage floor. The limb is made by cutting a piece of 12″ stock to shape on a band saw or with a key hole saw. Brace it securely on both sides with pieces of 2″ stock. To make the tree appear more irregular, nail on several pieces of shaped contour stock as shown in the drawing. Next, cover the whole construction with light chicken wire, fastening it into place with small staples Fig. VA. As you proceed leave a few artistic bumps and bulges. It will add to the natural appearance of the finished product. Have a pail of rather thin gelatine glue





Making a decorative urn. First model the urn in clay (Fig. I), then paint it with sweet oil, place it in a wooden box (Fig. II), and fill box with plaster of Paris. When hard (Fig. III), remove negative mold, and paint interior with oil. Fill this with paper-backed glue (Fig. IV), let it dry, and remove it with a knife.

Prop Builders

by

LEROY STAHL

cooking on a stove. Take pieces of heavy building paper about 1'x2', dip them in the glue, and then apply it to the tree. Wrinkle the paper, as you proceed, to appear like bark. Care must be taken to have all the wrinkles match. When the glue is dry, paint the tree in either a dark gray or brown, adding suitable highlights and shadows to improve its contour. The tree's foliage is painted on a flat piece of muslin and hung from the flies above. (FIG. V-B.)

The general method of constructing rocks (Fig. VI) is the same as the making of trees. The wooden frames (Fig. 1) are made to resemble rocks as closely as possible. Use 3" stock in the building. Cover the frames with chicken wire (Fig. 2) as you did previously, remembering to keep the form as rock-like as possible. Using the same mixture of glue.

[*Continued on page* 128]

All properties in this scene, made of papier mache, are easily constructed by amateurs.

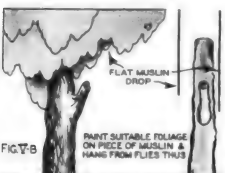
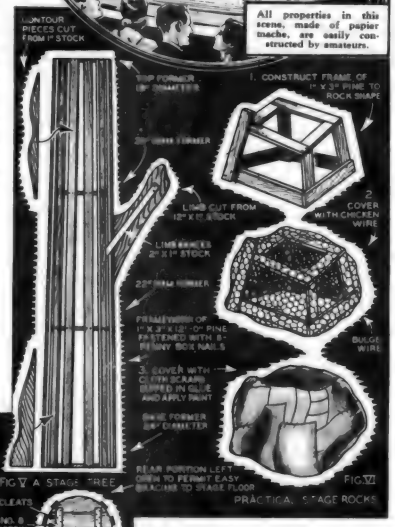


FIG. V-B

FIG. V-A

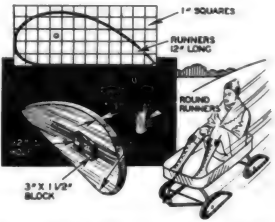


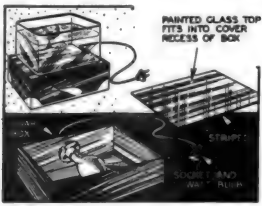
Both trees and rocks are constructed over a wooden frame. After the frame is completed, it is wrapped with common chicken wire to conform to the desired shape. Paper is then dipped into hot glue and laid on the wire. On a tree, it is wrinkled to simulate bark. When the glue is dry, a coat of paint is applied as the finishing touch.

HANDIKINKS FOR HOME WORKSHOPS

Runners Convert Wagon to Bobsled

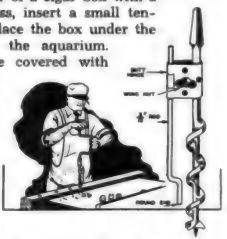
A SET of stream-lined runners, easily attached to the axles, convert a summer coaster wagon into a de luxe winter bobsled. The runners should be constructed of inch hardwood with the grain running lengthwise to prevent splitting. They should be strengthened with a wooden brace screwed above the center where it fastens to the axle. When completed, the bottoms should be sanded smooth and treated with linseed oil. Never paint runner bottoms.—Andrew Kobza.





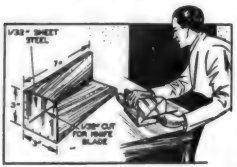
Aquarium Lights Produce Novel Effect

COLORED lights filtering through the water of small home aquariums produce startling effects. Replace the cover of a cigar box with a hand colored glass, insert a small ten-watt bulb, and place the box under the glass bottom of the aquarium. The box can be covered with paint or cloth to provide a finishing touch.—Sidney Nannes.



Rod Clamps to Bit Shank as Depth Gauge

A ROD held to a bit shank by a clamped butt hinge is easily constructed, and eliminates doubt and needless guess work when depth boring.—O. E. Olson.

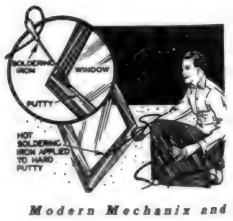


Slotted Box End Centers Lathe Stock

A DEVICE for centering stock in lathe work is constructed of two one-inch boards set at right angles, and a piece of accurately slotted sheet steel. The stock is pushed into the corner and marked along the slot. Then it is turned over and marked again. The lines cross in the center. This may be used to center either round or square stock.—E. F. Richter.

Hot Soldering Iron Loosens Hard Putty

GLASS cutters who are frequently called upon to remove a window pane often find it difficult to do so due to the fact that the putty, hardened by age, sticks to the window frame and chips the glass. This can be eliminated through the use of a hot soldering iron. Draw the iron slowly over the hardened putty, and it will soon soften to the point where it can be easily rolled into balls and removed.—Vernon Tracey.



Auto SHOCK ABSORBERS *Make* ROWING MACHINE

Mount shock absorbers on hinged platform to permit vertical motion of "oars" as in rowing. Construct frame and rolling seat from hardwood according to above plans.

ON THIS hydraulic rowing machine the action of oars in rowing a boat is closely approximated. Leg, back, and arm muscles all come into play on the working stroke, and get their period of rest on the free return stroke.

Almost any type of auto shock absorber having a swing of at least 60 degrees and a 12-inch lever arm may be used here. Packing glands should of course be replaced if worn. The spring is removed from beneath the piston of each unit; in models where the valve is held in place by this spring, make a lighter one from spring brass wire, just strong enough to hold the valve in position during the up-stroke of the piston.

The lever arm must be straightened, and

Heavier types of absorbers are best suited for rowing machine. Overhaul as indicated in sketches, then mount.

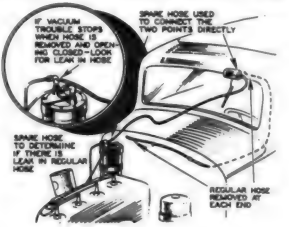
1¾" diameter fir tent pole stock fitted to it.

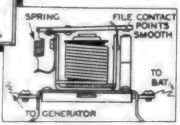
Ordinary automobile oil, in a viscosity which will give the desired resistance, may be used in the absorbers. Use a maximum filling.

USEFUL SUGGESTIONS FOR MOTORISTS

Locating Vacuum Tank Trouble

VACUUM troubles, in automobiles not equipped with a pump-feed fuel system, are neither difficult to locate nor costly to repair. The common cause of vacuum failure is a leak in the air hose leading to the windshield wiper. The hose connection to the vacuum tank, therefore, should be the first point of inspection in case of trouble. If the wiper refuses to operate and a leak in the hose is suspected, the labor of uncovering the hose is saved by running a spare hose directly from manifold to wiper. Then if it does not work, the trouble is in the wiper.—R. F. Jennings.





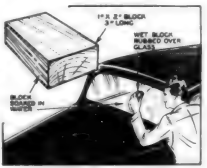
Above—A relay switch. Right—A cross section showing construction. Trouble develops either in spring or points.

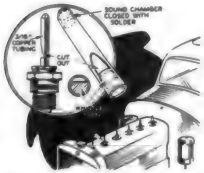
Deadened Batteries Result From Stuck Relay Points

THE points on the relay switch in the circuit breaker between generator and battery often become roughened and stick together when the motor stops. This causes a reverse flow of electricity from battery to generator resulting in a dead battery. Filing these points usually will eliminate bothersome sticking.—Jay Olsen.

Water Soaked Block Cleans Bugs Off Windshield

THE windshields of automobiles traveling at a high rate of speed during the summer become splattered with insects which dry into a hard, water resistant crust. This can be removed by soaking a 2 by 2 or 2 by 4 block of wood in water and pushing it over the windshield. Softened by the water, the block moves easily and cleans without scratching the glass. In winter, a cloth soaked in a salt solution and pushed over windshield will remove ice.—Maud C. Leachman.



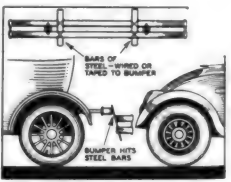


Gauge Stops Whistling When Piston Reaches Top

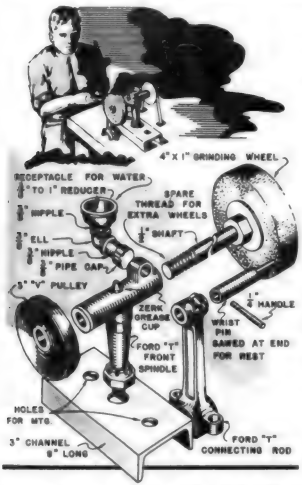
A WHISTLE set into a spark plug opening stops whistling to determine the top dead center of the piston and is very useful when setting timing gears. It is constructed of $\frac{3}{16}$ inch copper tubing set into an old spark plug. The sound chamber is sealed with solder and slotted for air escape.—Mark Doane.

Rod On Bumper Aids In Pushing Automobiles

THE use of a steel rod makes it possible for an automobile with a low bumper to push an automobile with a high one. The bar is placed between the upper and lower sections of the bumper and tied in place with wire or tape. In emergency cases, a tire tool or jack handle may be used as a rod.—Martin Senn.



MAKE SHOP POWER TOOLS FROM OLD AUTO PARTS



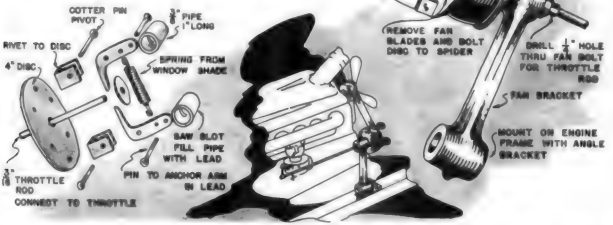
Drawings show assembly of heavy duty grinding head and tool rest. Drill hole in spindle for grease fitting. Two nuts hold spindle to channel. Dip tools in water cup to cool.

A STURDY, accurate grinding and buffing head, with steel shaft running in bronze sleeve-type lubricated bearings, is not hard to assemble from model T Ford parts. With the heavy all-steel construction used here, heavy loads may be handled at high speeds with quiet, smooth operation.

A front spindle with newly replaced bearings is mounted in a length of channel iron to serve as grinding head. A length of ½" steel shafting is threaded for whatever nuts are on hand; if a drill chuck is to be used on the pulley end, cut 24 threads to the inch on an engine lathe.

A 1"x4" grinding wheel will be found best for all-around use with a 3" pulley.

Where auto engines are used to pull variable loads such as wood saws or welding generators, a device which will open the throttle automatically as load is applied will be found useful. This governor, mounted on a Model T Ford fan bracket, operates by centrifugal force. As the motor races, the governor weights fly farther out, pull out the disc, and cut down the gas supply.



Individual parts of governor unit, pictured at left, appear as in sketch at right when completely assembled. Mount unit far enough out to be in line with throttle, using longer fan belt. Adjust so throttle is wide open when engine is stopped.

WHEN YOU

by **SAM RABL**
Naval Architect

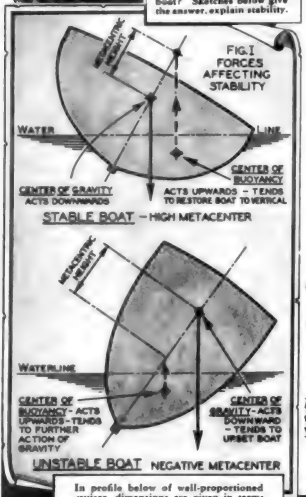
Will high waves tip your boat? Sketches below give the answer, explain stability.

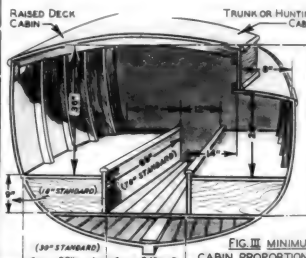
IN THE remodeling of any water craft, whether it be a lengthening process, the installation of a cabin, or simply a change of engines, beauty as well as seaworthiness can be achieved easily by following a few basic principles of naval architecture.

The best-looking boat afloat is worthless if it is not seaworthy. Then, too, while your boat may be perfectly safe in any weather, it is graceful lines that make her stand out among sister craft.

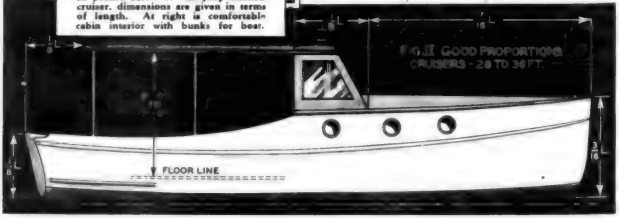
Buoyancy is an important factor in seaworthiness. If we were to take a huge tank and fill it to the brim, then set your boat in that tank, we would find that the weight of the water that overflowed would just equal the weight of the boat.

If we could solidify the water around the boat, then remove the boat from the tank, it





In profile below of well-proportioned cruiser, dimensions are given in terms of length. At right is comfortable cabin interior with bunks for boat.

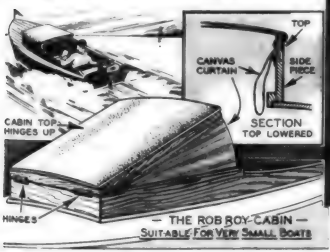


CHANGE THAT BOAT

would take the boat's weight in water to fill the hollow. Now if we were able to solidify this water we poured into the hollow, then remove and set it up on a sharp edge as a fulcrum, the point of balance would be the center of buoyancy.

Let us suppose that our boat is floating. If we board her at a point exactly above her center of buoyancy and walk forward, her bow will go down. The amount that the bow will go down will depend first on our weight and next on her size. If we were to walk back, the stern would sink. If we walk to one side the boat will float lowest, or list, on that side, causing a transverse change of trim.

In the making over of any craft we must bear in mind that her first designer so placed his weights that the center of gravity, or the concentrated center of all of the weights was directly over the center of buoyancy. When we install a heavier engine in a boat we must so place it so that it does not affect this trim. If the engine were forward and we decide to place it aft we must in some way place com-



Hinged cabin roof may be raised to give ample head room, lowered in heavy seas to improve seaworthiness. This type of cabin is used chiefly for protection against rain. Constructional details for it are shown at left.

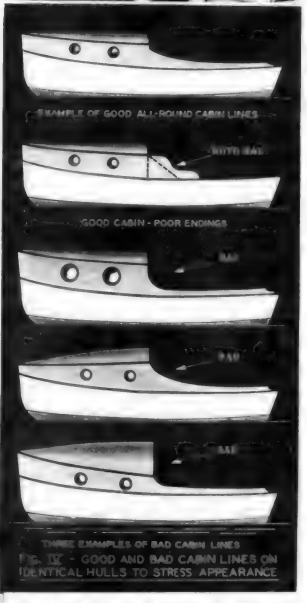
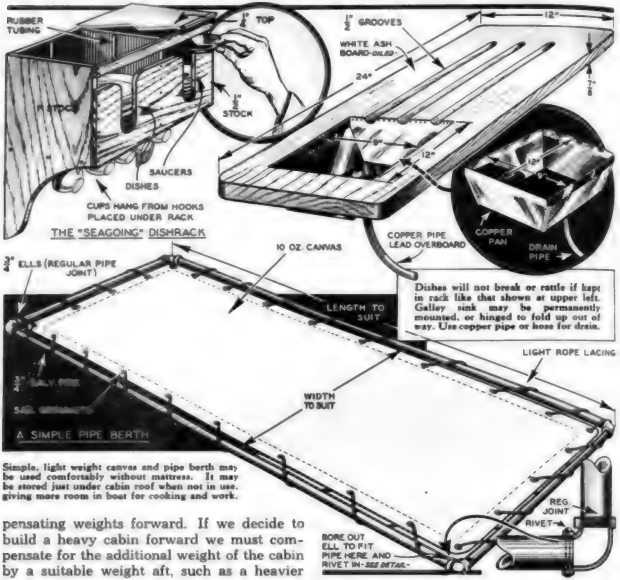


FIG. IX - GOOD AND BAD CABIN LINES ON IDENTICAL HULLS TO STRESS APPEARANCE

Save Money By Building Your Own Equipment For The Cruiser Cabin



Simple, light weight canvas and pipe berth may be used comfortably without mattress. It may be stored just under cabin roof when not in use, giving more room in boat for cooking and work.

pensating weights forward. If we decide to build a heavy cabin forward we must compensate for the additional weight of the cabin by a suitable weight aft, such as a heavier engine.

Altering of longitudinal stability by placing weights too far forward or aft will not affect the seaworthiness as much as will changes in transverse stability. We have seen how some boats will roll in a seaway while others will be as steady as a pavement.

In the balancing of the solidified water that a boat displaces, we have located the longitudinal position of the center of buoyancy. Somewhere between the waterline and the keel there is a vertical location for this center, this point being known by naval architects as the metacenter. As a general rule, when the center of buoyancy is close to the water line the stability is very good; when it is far below the water line, stability is bad, assuming, of course, that the center of gravity is in a normal position.

As the boat is heeled or listed over, the center of buoyancy in any normal design will move out from center line. The center of gravity will stay in the same position so if we examine Fig. 1 we will see just what the metacenter is. We have projected a line per-

WHEN YOU CHANGE THAT BOAT—

DON'T try to crowd aboard the accommodations of a boat twice her size. You won't be comfortable.

DON'T build her too high. She'll appear clumsy.

DON'T try to make a sea-going cruiser out of a speed boat. It will only end in a failure.

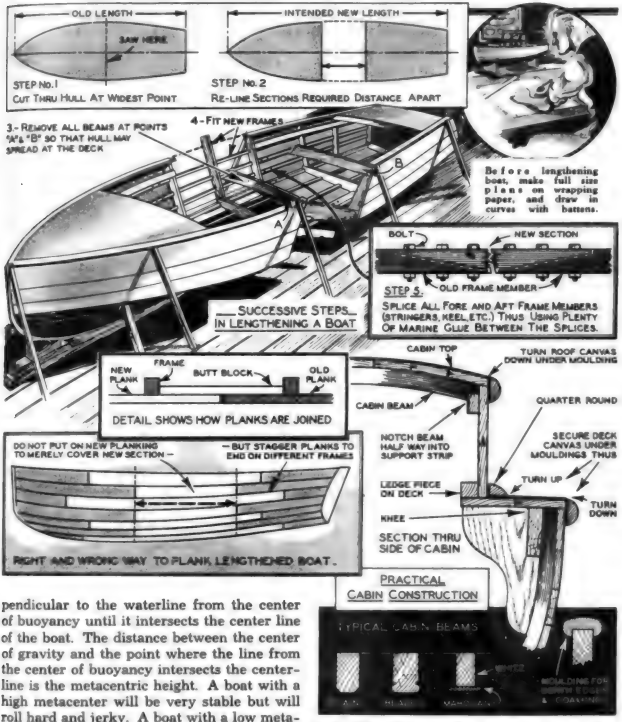
DON'T try to convert a long narrow hull into a cruiser. There just isn't room for a decent cabin.

DON'T try to revamp some old boat that you may buy at a wonderful bargain, unless her timbers are sound. She'll cost you more than a new boat.

DON'T put a lot of money into an outmoded boat without considering her resale value.

DON'T, if you are not absolutely sure of the condition of a boat, ever purchase her without an expert's advice. And stay away from those "country store" experts!

Use Strong Frame And Planking Splices When Lengthening A Cruiser



Above kinks will help beginner planning to lengthen boat and build cabin. Use marine glue freely at all frame joints.

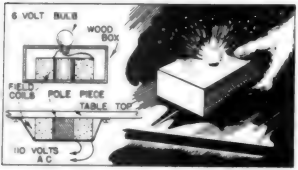
pendicular to the waterline from the center of buoyancy until it intersects the center line of the boat. The distance between the center of gravity and the point where the line from the center of buoyancy intersects the centerline is the metacentric height. A boat with a high metacenter will be very stable but will roll hard and jerky. A boat with a low metacenter will roll long and slow. A boat with a negative metacenter will turn over. A slow rolling boat is desired providing the amount of roll is not excessive. The metacenter we have been dealing with is called the transverse metacenter. There is also a longitudinal metacenter which affects the fore and aft trim; this will not bother us much if we watch the placing of our weights.

Freeboard, the distance between the waterline and the railing or deck is another important factor in seaworthiness. Low freeboard tends to make a stable boat, but one which will take in waves. High freeboard tends to make a boat unstable, so a happy medium must be found between the two extremes.

Symmetry in the ends of boats can improve or destroy seaworthiness. A double ended

[*Continued on page* 120]

STUNTS WITH ELECTRICITY

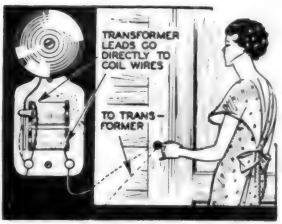


"Magic Light" Glows Without Batteries

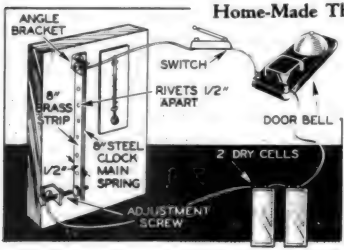
MYSTIFY friends by passing electricity through the air to operate a small light bulb. A field coil from an old automobile generator is concealed in the "magic light box," and connected to the bulb. Under the table is another coil with pole piece, this connected to the 110 volt A. C. house current. Current passes from one coil to the other by induction. —R. F. Jennings.

Make Doorbell Work Without Contacts

DOORBELLS which are usually thrown away when contact points become burned or corroded may be connected to a bell-ringing transformer to work without these contacts. Simply disconnect the wire that goes to the stationary contact point, and connect it to the armature or to the coil directly. Adjust the clapper of the bell or the vibrator of the buzzer until a pleasing pitch is obtained, and your doorbell will be as good as new. The armature will move twice for each cycle, giving a 120 cycle note.—E. J. Novak.



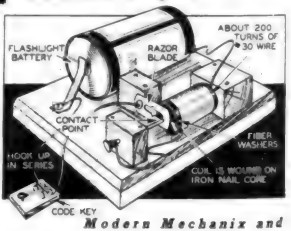
Home-Made Thermostat Is Heat Control Alarm



WARNING you when the house temperature is below normal by ringing the doorbell, this heat control alarm forms a simple and inexpensive substitute for automatic temperature control equipment. Lengths of brass and clock spring are riveted together to form the thermostat element. Connect up to doorbell and batteries or transformer. Place the switch in some convenient position where it can be opened for a few minutes after each alarm.—W. A. Thompson.

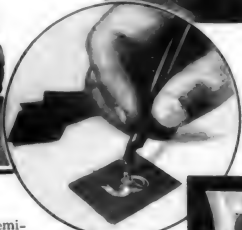
High Note Buzzer Uses Razor Blade

IN MAKING a high frequency buzzer for code practice, a razor blade will be found to have just the right stiffness for the armature. The coil may be about 200 turns of around No. 30 D. C. C. wire wound just back of the head on a heavy nail. The contact point is another nail set into a small wood block, where it can be pulled in or out with pliers. The razor blade is at right angles to the coil.—H. E. Throsel.



Paste Etches Initials in Glassware

Left—Etching initials on electric light bulbs to prevent theft. In etching bulbs, the name is written into hardened paraffin, after which the paste is applied for a period of five or ten minutes. Right—Dipping a piece of wrapping paper in melted paraffin—the first step in making stencils.



Left — After the paraffin has hardened on the wrapping paper, the initials are traced and carefully cut out with a sharp knife. When cutting the letters O, Q, and A, the center sections must be saved to prevent a blurred etching.

Right — A tumbler must be heated by filling it with hot water before the stencil is applied. The wax holds stencil in place.

WITH an economical, easily mixed chemical paste that can be made and used with perfect safety, it is a simple matter to etch initials, names, and numbers on glassware. Lamp bulbs can be quickly marked for identification; names and numbers can be etched into door and window glass without the removal of the frame.

To make the paste, measure out five teaspoons of sodium fluoride into a wide-mouth bottle, add one teaspoon of zinc chloride and a scant teaspoon of potassium sulphate. Then add sufficient water to make a paste, and mix well in a wooden skewer. This forms the permanent stock material. To prepare it for immediate use, place a little on a sheet of waxed paper and add hydrochloric acid to make a creamy paste.

In etching names on electric bulbs, dip the bulb in paraffine and scratch the name through the wax. Then apply the paste. It will etch only where the wax is removed. In placing initials on glassware, however, a stencil is necessary to obtain uniform work.

To make stencils, dip strips of wrapping paper in hot paraffine. Using letters and initials as a guide, take the point of a sharp knife and carefully cut the stencils. Then affix them to the glass surface by warming the glass and pressing the stencils into place. Warm goblets by filling them with hot water; warm windows by using hot cloths. When cooled, the stencils will stick in place.

Left—The dry mixture is prepared for use by placing a teaspoonful on a piece of waxed paper and mixing with acid until it forms creamy paste. The spoon must be dipped in wax before using.

After the stencil is securely fastened to the goblet, the paste is applied with a wooden skewer. Care must be exercised so that the paste fills all the holes in the stencil to insure perfect work.

Making "Third Dimension" Spectacles

Line up stereoscopic lenses as shown, then cement in position as at right to make "third dimension" spectacles. Mount prints on cardboard with rubber cement after aligning.

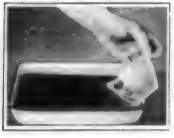
SEE your own photographs in true perspective with these inexpensive, easily-made "third dimension" spectacles—enjoy "living scenes" where every contour, every figure is distinctly visible.

The principle of the old-fashioned stereoscope, with its double-image views in which figures and scenery stood out in bold relief, is merely applied to your own snapshots.

First get the lenses from an old stereoscope—you can generally locate these at a rummage sale or second-hand bookstore—and a dime-store pair of eye-glasses. Mount the lenses in the spectacle frames, cementing them in with balsam or collodion.

Have two prints made up in postcard size or even smaller for each of your snapshots. Trim off the right margin of one, the left margin of the other. Holding the prints, one in each hand, about 9 inches from the eyes, overlap the pictures until they appear as a single image, giving stereoscopic vision when held at the correct focus.

Tinting Photo Prints With Dyes



To tint photos, completely immerse in dye solution, then allow to dry on newspapers.

USING any of the powdered dyes sold for household purposes, photographs can be tinted in a wide variety of colors simply by immersing in the different dye solutions.

Dissolve the dye powder according to the instructions coming with the package, then place the solution in some flat dish or a photo developing tray. The tray should be deep enough to insure that all parts of the print will receive an equal amount of coloring.

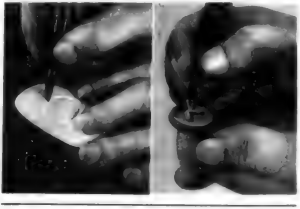
Dyeing the photos in this manner affects highlights of prints more than the shadows.

Floodlight Built at Little Cost

Set ring-bolt in metal lamp shade as shown, to serve as photo floodlight.

A CONVENIENT reflector for the photoflood bulbs used in indoor photography may be assembled in a few minutes, using an ordinary turn-button lamp socket and one of the metal lamp shades obtainable at any hardware store. A 12-inch diameter unit will prove a convenient size for amateur use.

Mold Stamps With Wood Filler



Carve desired design for marking stamp in soap, fill the mold with wood filler, then trim stamp with sharp knife.

INITIALING of your laundry is easily done with this marking stamp, molded from composition wood.

Carve the desired initials and design on a flat bar of soap. Fill in this mold with wood filler to a depth of 1/8", then allow to dry. Cement the rounded end of a clothespin in place as a handle. Even up the printing surface by rubbing over a piece of sandpaper on a flat surface. When marking laundry, use with an indelible ink pad; for marking packages and other articles, an ordinary stamp pad may be used.

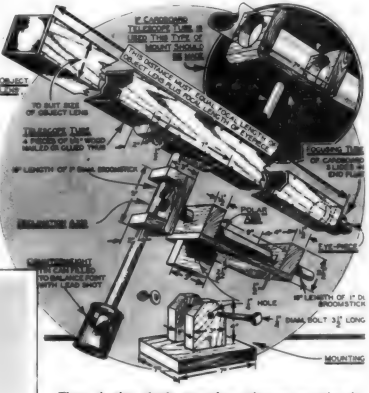
See PLANETS with $5 TELESCOPE

THE mountains on the moon, the planets and a myriad of other subjects in the star-filled heavens may be explored with this simple equatorial telescope, costing less than $5 to build.

You will need either a cardboard cylinder or a square wood tube for the body of this telescope. This tube is mounted on broomsticks turning in wood blocks, as pictured in the diagram, to permit pointing to any part of the heavens.

The correct length of the telescope tube is obtained by adding together the focal lengths of the

This simple equatorial telescope mounting, built by 14 year old Iowa youth, costs less than $5 including good grade lenses. Tripod stand is made of 2"x2" pine lumber.



These sketches clearly show how telescope mounting is assembled. Counterweight keeps telescope steady at any desired position, yet enables it to be moved easily when following motion of stars or planets. Lens mountings can be worked out by builder to fit any lenses available.

object lens and the eyepiece used. A suggested combination of lenses, which can be secured from any good optical company, is an eyepiece with 1" focal length, and an object lens of about 70" focal length. Since the power of the equatorial telescope is the ratio of focal lengths, this would give a magnifying power of about 70 times.

The eyepiece is best mounted in a small cardboard tube which can be slid a few inches either way, to offset any errors in calculating the tube length.

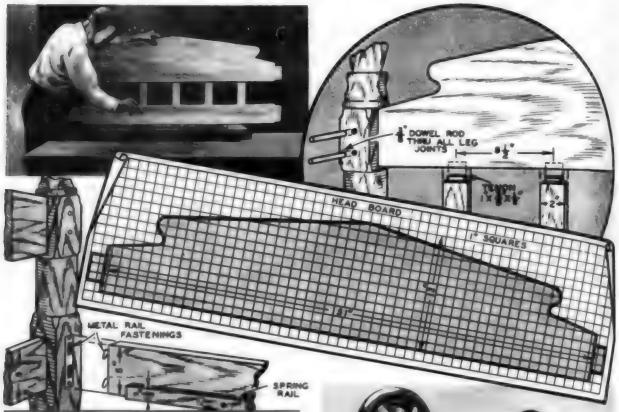
Mount the telescope unit on some kind of stand which will bring the eyepiece at a convenient level for you. A simple wood tripod is used successfully by many builders, and has the advantage of being easy to move around. Varnish or paint all parts as a protection against weather. Paint the inside of the tube a dull black.

As you know, the stars appear to revolve about the North Star—the point towards which the earth's axis is directed. The telescope's polar axis must point at this star, or at the equivalent, the angle of your latitude. This is readily done if the telescope tube is set parallel to the polar axis, and the entire unit turned until the North Star is seen in the telescope. The clamping bolt at the bottom is then tightened permanently.

If you look at objects such as trees or houses, the images will be upside down.

Do not use your telescope in the house by pointing it out through a window pane; the glass will blur the stars.

USE COLONIAL WOODCRAFT



Slats are mortised into head of bed as shown in circle, then checked for alignment for gluing, as in top photo. One type of metal rail fastening which works nicely is shown above.

by O. E. OLSON

TRUE Early American furniture portrays the dignity and vigor of our sturdy ancestors and manifests their determination for security. This full size, four-poster bed is an excellent example of the simplicity of design and durability of construction which seem to have been the paramount issues with Colonial craftsmen.

The most satisfactory wood to use for this project is hard maple, thoroughly air seasoned or kiln dried. As an extra precaution, select material of even grain and uniform color.

Begin by turning the four posts from square stock, following the dimensions in the diagram. The top turning should conform closely with the graphed layout drawing, as the design is distinctly Colonial.

It may be necessary to glue up ¾" stock for the upper cross board on the head and foot as the width is 12". Should this be necessary re-enforce the glue joints with deep

Lay out 1" squares on head board stock, trace in design, then cut out piece carefully on bandsaw, as illustrated in photo.

set dowel pins. Rough-out the cuts on the bandsaw and dress straight edges to line with a plane. Tenons 3"x1½"x½" are quickly cut on the circle saw or can be made by hand without a great deal of effort. Two lower cross pieces of ¾" stock 5" in width are required. These pieces require tenons of the same size as the upper cross piece.

Make next the slats, ten in number, of which five, for the head, are 17"x2"x½" and five for the foot are 6"x2"x½". Allowance must be made in length for ½"x¼"x1½" tenons making the slat stock length 18" and 7" respectively. Mark out the slat mortises on the cross pieces 8½" from center to center and cut to a depth of slightly more than ½". Assemble the cross pieces and slats, gluing

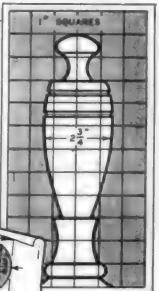
ON THIS FOUR-POSTER BED

Decided Early American influence in line and construction, rather than exact reproduction of some specific design, is shown in this full size four-poster Colonial bed. The hard maple recommended was used extensively in making Colonial furniture.

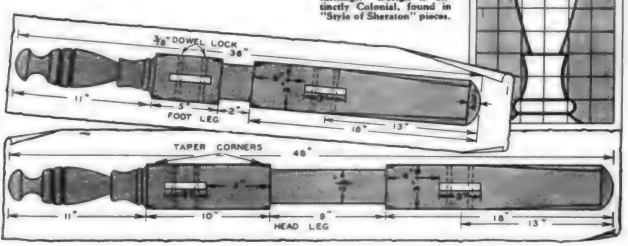
all slat joints. Check carefully for squareness while clamping. Casein glue is recommended because of its slow setting qualities, thus permitting more careful work.

Next cut the mortises in the legs as shown, making them slightly more than 1½" deep. If you have a mortising attachment for your drill press this job is easy, but even the hand method of boring and chiseling is not tedious, as the mortises are wide and easy to work in. When this is done and the cross assembly securely set, make a test fit of all leg joints. If all draw up tight and even, glue, clamp and let set for twenty-four hours.

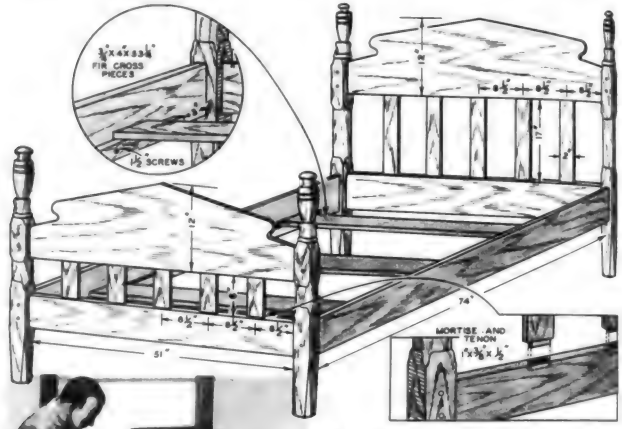
Next comes the lock pinning, that feature of Colonial construction so vital to the permanency of the piece. Bore two ⅜" holes completely thru each leg in such a manner as to pass thru the tenon of the cross piece. Glue and



Dress down maple stock for bed legs to 3"x3" size. Carefully locate centers, then set up in lathe and turn top to design shown in squared paper sketch at right. Make sheet metal template of this to serve as guide if you have difficulty in cutting duplicate turnings. Design is distinctly Colonial, found in "Style of Sheraton" pieces.



Mortise and Dowel Joint Assembly Gives Strength to Colonial Bed



Mortise and tenon joints are used in assembling Colonial bed, with wood dowels or lock pinning through corner posts to reinforce head and foot. End slats fit into cross-pieces.

If using light lathe with extended bed as shown in photo when turning legs, do not run lathe faster than 1,200 r. p. m. Sand legs thoroughly, without changing contours.

drive in dowel rods and dress down to the surface.

The rails are of ¾" stock 5"x74". Do not slight the sanding of the rails as they are visible when the bed is made. A strip ¾"x½"x68" is screwed to the lower inside edge of the rail. This strip is to hold the three fire cross pieces shown in the diagram. The dimensions of the fir cross pieces are ¾"x4"x53¼".

The hardware for the rail fastenings may be purchased in various designs. Select a strong and serviceable set, preferably one that draws the side rails firmly to the leg. The type shown in the drawing is satisfactory and easy to install. Casters are optional but are not in conformity with the piece. Glass slide plates or silencers are very inexpensive and are more satisfactory.

Next set up the bed and spot sand any rough places or glue marks preparatory for finishing. Apply a liberal coat of raw linseed oil and let stand for several hours. Rub off any surplus oil not soaked in. The oil will give a mellow tone very characteristic of aged Early American furniture.

If a color other than the natural is desired, apply an oil stain and rub in with a cloth. A wax finish on hard maple is very durable and brings out the true beauty of the wood. Two coats of wax, each well rubbed, should be sufficient. A more permanent finish can be produced with a coat of white shellac over linseed oil or stain, shellac to be rubbed when dry with fine steel wool. Wax produces a soft satiny finish while shellac gives a bright and more lustrous tone. Either type of finish requires considerable rubbing for the best results.

Standard springs and mattresses, chosen at the option of the builder, fit into the side rails. If an inner coil spring mattress is used, the bottom may be completely boarded over to form a smooth support.

KINKS FOR THE HOME HANDYMAN

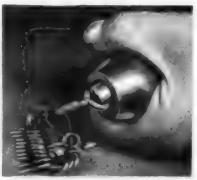
Saw Blade On Wooden Disc Cuts Round Holes

AN ORDINARY hack saw blade fastened to a wooden disc performs efficient service cutting round holes in plywood, bakelite, and other thin materials. The cutters are easily and quickly made, and the results obtained compare favorably with those obtained with tools made especially for that purpose. Cut a disc of hardwood to the required size, measure the circumference, and clip a piece of hack saw blade to fit. Drill screw holes in the upper edge on both ends and in the center, and start corresponding holes in the disc to avoid splitting. The metal bit shaft is then inserted in the exact center of the disc. The end of the shaft must be slotted to fit a pin placed in the wood to prevent slipping. This cutter may also be used in the chuck of a drill press.—Clark Eaton.

Discarded Radio-Auto Fuses Make Practical Levels

A BURNED out radio or automobile fuse can be converted into a practical and inexpensive level which, attached to a yard stick, performs with surprising accuracy. Heat the metal end caps and twist them off, taking care not to break the glass. Fill the tube with water or light oil, leaving a small air space, and plug the ends with cork. Secure metal caps on ends with a little glue or cement to prevent leakage.—Kenneth Murray.

Hand Brace Easily Sinks Screw Eyes In Wood



A LARGE number of screw eyes to be inserted into a project, present, as a general rule, difficulties both of time and accuracy to the hobby builder. The use of a small rod slipped through the eye and used as a lever often results in a crooked insertion; pliers are cumbersome and hard to handle with any speed. These difficulties are solved through the use of an ordinary brace to facilitate accuracy and speed. The screw eye is gripped in the brace chuck and the weight of the body helps to drive it in. When using this method, be sure the thread extends straight outward.—M. Fischer.

Cloth Seals Dents In Zerk Type Grease Nipples

OFTEN Zerk type grease nipples become damaged by flying stones to an extent where they do not make a tight seal with a pressure gun, and lubricant cannot be forced into its customary chamber. A double thickness of cloth over the nipple provides a perfect seal. Grease is easily forced into the grease nipples through cloth mesh.—Ross Wheelton.

Mouse Trap, Dry Cell, and Bell Form Novel Fire Alarm

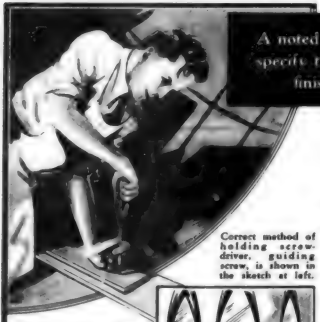
A SIMPLE fire alarm is constructed from a mouse trap, a dry cell battery, and an old door bell. Remove all the parts of a mouse trap but the spring mechanism. This is wired to serve as one pole of an automatic switch. The other pole consists of a piece of tin under the trap arm, separated from it by a layer of paraffin. These two poles are connected to a dry cell battery. When the heat reaches a dangerous height, the wax melts, and the trap arm contacts the tin pole, completing the circuit and ringing the bell.—G. H. Jenkins, Jr.

HOW TO BUY AND USE SCREWS

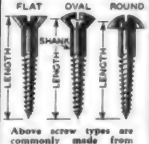
A noted workshop authority tells you how to specify the gauge, length, type of head, and finish when ordering wood screws.

by **VERNE C. FRYKLUND**

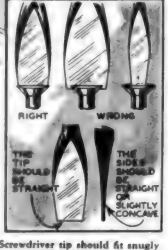
Industrial Education Division
University of Minnesota



Correct method of holding screwdriver, guiding screw, is shown in the sketch at left.



Above screw types are commonly made from iron or brass.



Screwdriver tip should fit snugly and be width of slot.

Holes for flat and oval head screws are countersunk to diameter of screw heads. Apply soap when in hardwood.

When you order wood screws, four things must be specified—the length, gauge, shape of head, and finish. If you want some 1¼-inch long flat head bright iron screws of medium thickness, you should ask for 1¼-inch No. 8 flat head bright screws. In hardware catalogs this screw would be listed as: 1¼" No. 8 F. H. B.

Flat head iron screws are usually sold in the bright finish, and round head screws in the blue finish.

The selection of the gauge used depends upon the job. If the stock is rather thin, leaving very little around the screw, order a small gauge in the length being used.

The length of flat head screws is measured over all, while round and oval head screws are measured from the bottom of the slot to the point of the screw.

Flat head screws are used in places where they should be flush with, or below, the surface. Use round head screws in exposed places, where the screws are intended to be decorative as well.

The tip of the screwdriver used should be just as wide as the screw head, and fit snugly in the slot.

SCREW GAUGES

LENGTH	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/4"	1 3/4"
GAUGES	0–4	0–8	1–10	2–12	2–14	3–14	3–16	4–18	6–20
LENGTH	2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/2"	4"	4 1/2"	5"
GAUGES	6–20	6–20	6–20	8–20	8–24	10–24	12–24	14–24	14–24

Black circles give exact size of shank; gauge is term used to specify this diameter, taken just under screw head. Table indicates what screw gauges are standard for different lengths of screws. 1½" screws are available in gauges 4 to 18.

Indirect Lighting Shows Ship Model in Decorative Relief

IN MANY homes a ship model is used to give a decorative effect to mantle or shelf. Often it is hidden in shadow at night. The use of subdued indirect lighting sets it forth in striking silhouette with romantic and imaginative beauty.

Any handy man can create such an effect in a short time. Using a pair of tin snips, cut a metal strip, and fashion it into a spring clamp. Bore a hole in the base, and screw it on the reverse hull of the ship.

Into this clip slip an intermediate sized light socket with a cord and plug attached. Then obtain a T-6½ lamp 4½ inches long, color it with lacquer (thinned to allow the passage of light) and turn it into the socket.

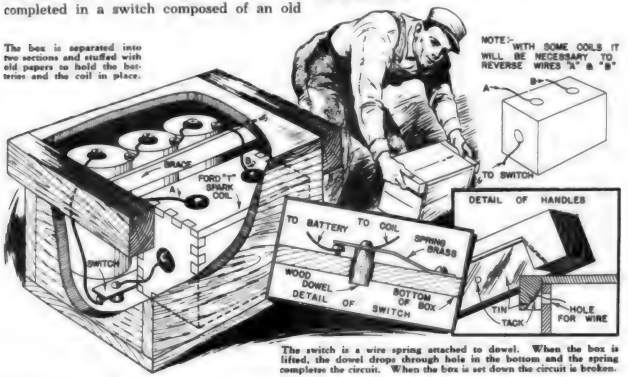
Another method of painting the light is that of putting sizing on the bulb to form a rough base and painting it with water-colors. Various shades of green will provide a good, soft background light for the model.

A ship model silhouetted by a subdued light. The insert shows how the light is constructed and fastened to the ship.

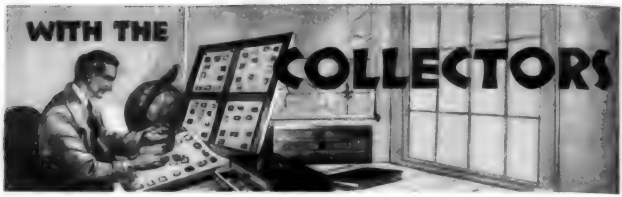
Old Coil, Telephone Batteries, and Box Make Simple Shocking Machine

A TRICK box, designed to shock the person who attempts to lift it, can be quickly constructed with several dry-cell batteries, an old Ford coil, a switch, and a small box.

The box is divided into two sections to hold the batteries and the coil in place. The batteries are wired to the coil, the circuit being completed in a switch composed of an old piece of phonograph spring and a wooden plug. One end of the spring is connected to the battery; the middle is fastened to the plug extending through a hole in the box. The handles of the box are lined with tin so that anyone lifting the box gets an electrical shock from the tin.



The switch is a wire spring attached to dowel. When the box is lifted, the dowel drops through hole in the bottom and the spring completes the circuit. When the box is set down the circuit is broken.



Waving adieu to friends at San Francisco, C. F. Anderson, sets out for Little America by way of New Zealand, carrying 60,000 letters which he will cancel at the South Polar base.

Postal Expert Goes To Little America

ENROUTE to Little America with over 60,000 letters to be cancelled in the shadow of the South Pole and then mailed back to stamp collectors is Charles F. Anderson, cancellation expert of the Postoffice Department at Washington, D. C.

Below-zero temperatures make the cancelling of this quantity of mail in the short time available no easy problem. Non-freezing inks must be used.

The tour of Anderson to Admiral Byrd's base is said to be the first time an American postal official has taken mail outside of our territory to be cancelled.

Stamps Honor Two Scientists

SOVIET RUSSIA and Italy honor on stamps two scientists familiar to high school physics students—Galvani and Mendeléyev. Galvani's first battery, made with a twitching frog leg, was displayed at Italy's Exhibition of Radio Electrical Biology.

Italy lauds Luigi Galvani with simple portrait on frameless stamp, while U. S. S. R. portrays Mendeleyev and Periodic Table of elements which he developed. Stamp dealers can supply both science sets in either mint or used condition.

Fables Pictured On Match Boxes

Japanese designers read legends, fairy tales before working up these interesting and unusual designs for match box covers.

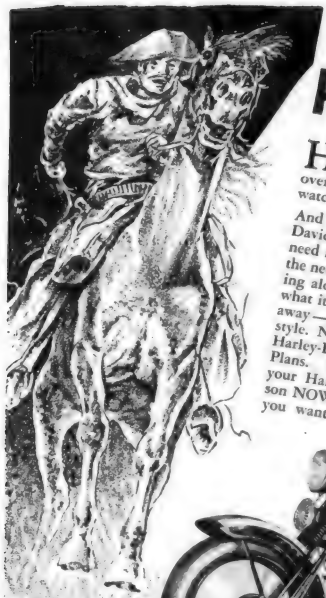
FOREIGN match label designers find many ideas for their work in fairy tale books, making the collecting of these illustrations on match box covers one of the most interesting of hobbies.

The story of the crow and the fox, known to all readers of Aesop's Fables, is to be found on boxes put out by a Japanese manufacturer. The flying dragon legend is also represented.

Riding the PONY EXPRESS!

HARD riders — those men of the pony express. Urging foam-flecked ponies over winding trails. "Make time" — was the watchword of those daring men of other days.

And "make time" is the slogan of Harley-Davidson riders today. Their tireless mounts need no urging. A twist of the throttle—and the new '35 Harley-Davidson takes you whizzing along the trail hour after hour. It's got what it takes for thrill-riding. Plenty of get-away — speed — stamina — and high-stepping style. No need longing to own one. Ask your Harley-Davidson dealer about his Easy-Pay Plans. Then have your Harley-Davidson NOW — when you want it most!



1935 HARLEY-DAVIDSON

Mail this Coupon

Harley-Davidson Motor Co. Dept. MM, Milwaukee, Wis.
Interested in new 1935 Harley-Davidson.
Send illustrated literature. Enclosing postage stamp to cover mailing cost.

Name_____

Address_____

My age is ( ) 16-19 years, ( ) 20-30 years, ( ) 31 years and up, ( ) under 16 years. Check your age group.

Italian airmail commemoratives.

Italy—Flying Man Aero Stamps
Canada—Birthday For Province

STAMP collections someday may become complete history texts, if scenic stamps continue to be issued at their present rate. Canada marks the 150th birthday of the province of New Brunswick with a 2-cent red brown stamp having a seal as the motif. Italy honors Leonardo, who in 1500 drew up plans for a plane very similar to those which fly today.

Seal of Province of New Brunswick, showing three-masted schooner, on "birthday" stamp.

ADLETS FOR HOBBYISTS

STAMPS

YOU'VE tried the rest now get the best! We have answered all advertisements, compared premiums, approvals, etc., and absolutely proven that ours are far superior. Send 10c for "Challenge Offer" with approvals. Bargain Stamp Service, 1332 South Hope, Los Angeles, California.

MAMMOTH Mystery Packet of rare stamps for only 10c to serious approval applicants, also valuable free premiums with every selection afterwards. Our stamps are better and our service different. Fair Play Stamp Service, 1215 Browning Blvd., Los Angeles, California.

SCARCE Iceland Airmail Triangle and fine packet of 65 different stamps including Senegal, Jamaica, Guinea, South Africa, Oceanica, Nigeria, savages, maps, and animal stamps. Only 5c to approval applicants. Potomac Stamp Co., Dept. 903, Washington, D. C.

WORLDWIDE cancelled and unused, including Australia, Czechoslovakia, India, Japan, Latvia, Poland, Sweden, Ukrainia, Union South Africa, etc., 100 varieties, 20c; 500, $1.30; 1000, $3.00. List free. McKee, 111 E. 13th, Covington, Ky.

MALDIVE ISLANDS, Brunei, Charkhari, Turks Caicos Islands, $5.U.S., genuine Baden, and Imperforate "Park" —absolutely free to approval applicants enclosing 3c postage. Viking Stamp Company, One Hanson Place, Brooklyn, N. Y.

BRITISH TURKISLANDS—Also Congo's—Montecarlo—Nigercoast—Uganda—Djibouti— Ecuadorian— Ivorycoast— Ubangi—Countries collectors need. Free for 5c postage. EMPIRESTAMPSHOP, Dept. M.M., TORONTO, CANADA.

FREE! Gorgeous Packet, including Uruguay airmail, beautiful Spain, ship and triangle. To Approval Applicants only, enclosing 3c postage. Royale Stamp Co., South Pasadena, Calif.

AIRMAILS—from Brazil, Chile, Colombia, Ecuador, Mexico—all for only 10c with double premium penny approvals. Progress Stamp Service, Franklin Park, Illinois.

105 DIFFERENT, Guinea, Congo, Hyderabad, etc., 3c to approval applicants. EXTRA—Airmail Set free with above. HUNZIKER, Box 225-F, Minneapolis, Minn.

STAMPS! 100 diff. 3c; 500 diff. 35c; 1,000 diff. 90c! Illustrated Album (4000 spaces) 22c. Approvals sent. Tatham Stamp Co. (D9) Springfield, Mass.

HEADQUARTERS—Stamp Collectors! Lowprice Sets. Penny Approvals. Request selection. Elyria Stamp Company, 437 MI. Elyria, Ohio.

FREE!!! Russia Ethnographic Set of Ten Pictorial Stamps. Postage 3c. ROBERTS, 901T Fourth, Baycity, Michigan.

SENSATION: Airmails from 10 countries; U. S., South America; Pictorials 10c. A. Steele, Springdale, Pa.

STAMPS Sent on approval. 50% discount. Fred Herzberg, 197 Grantley Ave., Elmhurst, Illinois.

110 DIFFERENT Stamps Free to approval buyers. Postage 3c. M. Badger Stampco, Milwaukee, Wis.

FREE! 25 Different United States to approval applicants. Brownie Stamp Shop, Flint, Mich.

COINS

$2000.00 FOR 1c. We pay the World's Highest Prices for old coins, encased postage stamps and paper money. Large Cents up to $2000.00 each. Half cents $250.00. 1909 cent $10.00. Indian head cents $50.00, half dimes $150.00. 25c before 1871 $300.00, 50c before 1879 $750.00, silver dollars before 1874 $2500.00, gold dollars $1000.00, trade dollars $250.00, 1822 $5 gold $5000.00, old paper money $26.00, encased postage stamps $12.00, certain foreign coins $150.00, etc., send dime for large illustrated list. Romanocoinshop, Dept. 420, Springfield, Mass.

FREE—Foreign coin, banknote, and large illustrated coin catalogue—4c postage. Souvenir California gold quarter size 26c; $½ size 53c; both 65c! Round or octagon, set of each $1.30! Approvals with each order. Tatham Coins, Springfield—9. Mass.

WE BUY Lincoln Head Pennies. Will pay up to $2.00 each if over ten years old. Indian Head pennies worth up to $51.00 each. Send 10c for Buying Catalog. Continental Coin Co., Incorporated, FD-111 West Jackson, Chicago.

FINE old Spanish silver "Pieces-of-Eight," also latest book on buried treasure by Harold Wilkins, World foremost authority. 128 Nelson St., Kingston, Canada.

WE PURCHASE All Indianhead Pennies. Price range 5c —$55.00. Purchasing catalogue 10c. Photonumismatic, 100 Forsyth New York.

CALIFORNIA gold, quarter size 27c; $½ size 53c; 100 different stamps and catalogue coins & stamps 10c. Norman Shultz, Salt Lake, Utah.

OLD MONEY Wanted. $5.00 to $2,500.00 each paid for old coins. Buying catalog 10c. Robert Cohen, Box 603, Muskogee, Okla.

HIGHEST Prices paid for Indian Head Pennies. Send dime for list of those wanted. Coin Shoppe, Box 407-MM, Ottawa, Ill.

WANTED—1931 Cents, other coins. List—dime. Michael Smith—Coins, Ambridge, Pennsylvania.

STEAL POWER *from the AIR!*

NEW INVENTION

Save$ Ga$

Users report 4 to 6 miles more per gallon

SAVES $180 A YEAR On my Plymouth 6 I obtained an average of 20 miles per gallon, an increase of 7 miles. This means a saving of $15 a month or $180 a year.—F. S. Peck, Calif.

$180 Saved by Motorist!

V-8 FORD I installed both Vacu-matics and they work excellent. On my own V-8 Ford I notice wonderful performance in pickup, get-away and gas saving. — Burt Burnett, Mich.

ALL WELL PLEASED Enclosed find order for 12 more. Everyone I have sold is giving from 4 to 6 more miles per gallon. I have 3 more orders for V-8 Ford. Everybody is well pleased.—J. O. Carll, Texas.

PLYMOUTH I am amazed at Vacu-matic performance. It's giving me 5 more miles per gallon. Walter Zielinski, Ill.

CHRYSLER Have tried the Vacu-matic and it sure is fine. Better pick-up with a 30% gas saving.—John C. Martin, Pa.

CHEVROLET The mileage on my 1933 Chevrolet jumped from 18 to 22 miles per gal. with Vacu-matic. Paul P. Haas, Mass.

DODGE Just completed 2310 miles on 92 gallons in my 1933 Dodge 6. This figures 25 miles while before I averaged only 20 miles per gal. on ripe.—Al Fruzyna, Calif.

FRANKLIN With Vacu-matic I have increased my mileage from 10.1 to 14.2 miles per gallon. I figure I save over $75.00 a year in gasoline. — R. K. Radtke, Wis.

MODEL A FORD Have been using the Vacu-matic for a month. I used to get 20 to 22 miles per gal. Now I get 30 to 33 . . . amazing the difference it makes —James

BIG CARS TOO Everything you claim about Vacu-matic is true. I now get 20 miles to the gallon on my Buick. Before I was only averaging 15½ miles.—C. Constantino, Fla

VACU-MATIC

The Carburetor Control that "BREATHES!"

NOW Automotive engineers have discovered the way to more perfect carburetion! The new VACU-MATIC solves the secret of greater power! With magic action, this amazing invention instantly puts new life and pep in any motor. It adds mileage to every gallon of gasoline . . . produces split-second pick-up, sensitive accelerator response, greater speed and smoother running.

New- *Automatic* - Nothing Like It!

The self-starter—four wheel brakes—knee action—streamlining . . . and now VACU-MATIC! The greatest motor improvement of recent years! With it, engineers have achieved a practical means of balancing air and gasoline automatically for all speeds. Vacu-matic is *entirely different!* It is AUTOMATIC and allows the motor to "breathe" at the correct time, opening and closing automatically as required. No idling troubles—no carburetor adjustments necessary. Just put it on and forget it! Sharply cuts fuel wastes, saves dollars in gas costs, reduces carbon and gives your engine new pep, greater power and longer life.

Fits All Cars

VACU-MATIC is constructed of six parts, assembled and fused into one unit, correctly adjusted and *sealed at the factory.* Nothing to regulate. Anyone can put VACU-MATIC on in a few minutes. Once on its only reminder is the surge of instant power and speed it gives to the motor and the savings it affords your pocketbook.

Agents and Salesmen

If you are interested in earning unusual profits, check coupon. Exclusive territories are now being granted.

The VACU-MATIC proves itself on every car. It is guaranteed to give worth-while gas savings, quicker pick-up and more power or it costs you nothing. "On my Nash I gained 17½ percent in mileage," writes J. Showalter. "Car idles down to 2 miles an hour and takes gas without a complaint." Arthur Williams—"On our Oldsmobile a test proved 18 miles per gal. Before we considered 13 good." Albert Richards—"With a Vacu-matic on my Model A Ford I increased from 18 to 24.7 miles per gallon. I am more than pleased. It paid for itself on just one trip."

Free Details

Learn about this remarkable device. See why your car is costing you extra money to operate without VACU-MATIC. Its cost is surprisingly low—often paying for itself on one trip or in a few weeks of driving. Don't drive your car another minute until you learn about Vacu-matic. Get the facts! Write today.

FREE OFFER COUPON

THE VACU-MATIC COMPANY
7917-75 W. State St., Wauwatosa, Wis.
Gentlemen: Please send me full particulars concerning the Vacu-matic and details of your Free Offer. This of course does not obligate me in any way.

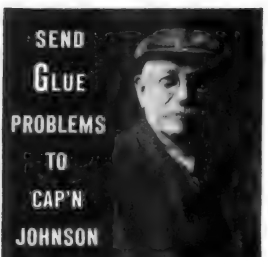
Name .....

Address .....

City ..... State .....

☐ Check here if interested in selling proposition.

The VACU-MATIC Co., Wauwatosa, Wis.



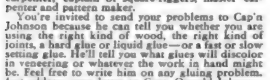
● He's the "trouble-shooter" on all glue problems for LePage's—and he ought to know glue. Born with a glue brush in his hand, he has handled all kinds for nigh on sixty years.

Capt. Johnson was a woodworker at the age of 10—then cabinet maker, blue-water sailor, ship's carpenter, captain of square-riggers, master carpenter and pattern maker.

You're invited to send your problems to Cap'n Johnson because he can tell you whether you are using the right kind of wood, the right kind of joints, a hard glue or liquid glue—or a fast or slow setting glue. He'll tell you what glues will discolor in veneering or whatever the work in hand might be. Feel free to write him on any gluing problem. Just address your letter to Capt. Oswald Johnson, Russia Cement Company, Gloucester, Mass.

RUSSIA CEMENT COMPANY

Laboratories and Factory • Gloucester, Mass.



BIG 1935 LEADER

GENUINE LEATHER TIES

1-In-Hands and Bows; Men's and Boy's. Fancy patterns. Look like silk. Cleaned with a damp cloth. Durable; won't wrinkle. SELL ON SIGHT. Big profits; repeat orders. Be independent, have your own business. E. M. SOLD 30 IN 1½ HOURS. No sales ability needed. Send 50c or stamps for sample and \$1. Information free.

CENTURY TIE CO. Dept. 7, 2333 W Grand Blvd. DETROIT, MICH.

OLD MONEY and stamps WANTED

POST YOURSELF! It pays! I paid J. D. Martin, Virginia, \$200 for a single copper cent. Mr. Manning, New York, \$2,500 for one silver dollar. Mrs. G. F. Adams \$740 for a few old coins. I want all kinds of old coins, medals, bills and stamps. I pay big cash premiums.

I WILL PAY \$100 for A DIME

1894-S. Mint; \$50 for 1913 Liberty Head Nickel (not buffalo) and hundreds of other amazing prices for coins. Get in touch with me. Send 4c for my Large Illustrated Coin Folder and further particulars. It may mean much profit to you. Write today to

B. MAX MEHL, 90 Mehl Bldg. Fort Worth, Tex.

(Largest Rare Coin Establishment in U. S.)

Customs Officials Expose Fakers

[*Continued from page* 69]

also, in texture and feel. Hand-made bolts also show inequalities and the ends taper to a point. Those made on a machine have the end cut off square.

"In checking on chairs the bottom of the leg is always scrutinized carefully. A chair 100 years old has been dragged around until the ends of the legs have acquired a polish that cannot be imitated.

Green Wood "Antique" Cures

"We turned down a shipment of eight chairs once in the face of assertions by outside experts that they were genuine. The upholstery was ancient in design and quality, but unworn, although the chairs were supposed to be 150 years old. Our examiner pulled out a few upholstery nails and there was no indication that other nails had ever been driven into the chair. A splinter of wood from the exposed edge was tested and it proved to be still green with sap.

"Several years ago we aroused the wrath of an Ohio woman, an interior decorator, whose purchase abroad of several small commodes was held up. The maker had copied old designs perfectly and had used wood of antique appearance for the outside, but the skeleton framework inside was patently new. It even showed the marks of a circular saw, and the runners of the drawers were not even worn down. A scratch through the varnish revealed that the apparently old wood was new too.

"The maker had used what we call a 'dirty stain.' Its composition includes, maybe, mud, ink, rusty nail water, lamp black, or what not. To the uninitiated, this imparts an unimpeachable aged appearance.

Create Wormholes With Shotgun

"Wormhole makers ought to remember to pick the bullets out of the wood before sending the furniture over here. Very frequently we find the shot still embedded at the bottom of the hole. And the nature fakers ought to know that real wormholes are never perfectly round or uniform.

"The tourists abroad are the worst hit. They pay fancy sums for supposed antique bronzes. These are made of lead, electroplated by the most modern process and pickled in sal ammoniac to produce the verdigris patina. We turn the object up and the base shows small round dots caused by the action of the electric current. If the bronze had been cast those marks would never be there.

"But the United States government is not out to 'get' anybody. It is an odd sight, though, to see a man who goes to Europe and throws his money around, then comes home and kicks when he gets stuck for a fine at the customs house."

BOYS! THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

THE VENTRILO

a little instrument, fits in the mouth out of sight, used with above for Bird Calls etc. Anyone can use it. **Never fails. A 64-page Book on Ventriloquism and the Ventrilo. All for 10c Postpaid.**
JOHNSON SMITH & CO. Dept. 619, RACINE, WIS.

LEARN TO DANCE —AT HOME WITHOUT MUSIC OR A PARTNER

This book will teach you in a few hours—at home—in private—how to learn old as well as modern dances—the Fox Trot Steps, the Tango, the Collegiate Dances, the Waltz, the One-Step, the Two-Step, etc., etc.

The book will train you to be an easy, confident dancer by a system so clear, so simple, so easy that you can start dancing correctly after you've been through your first lesson.

Every step is explained so thoroughly and so easy to follow, you'll be dancing before you know it. The Primary Positions of the feet are carefully illustrated and explained, which is so essential to learn correctly. Then see some of the dances described: SQUARE DANCE—The March, Quadrille, Movements. The Plain Quadrille, Lancers, Fine Arts, Favorite, Stained. The novelty. The Star, The Basket, The Reverse Quadrille, The Pretzels, The Royal Lancers, the Imperial Lancers, The Caledonians, The Alexandra, The Prince of Wales, The Glide Waltz, The Boston Waltz, The Hesitation Waltz, HOW TO DANCE—Trios and Modern Waltzes, The New Easy Waltz, The Hesitation Waltz, The Regular Waltz, The Two-Step, The Plain Polka, Polka Mazurka, Polka Redowa, Bohemian Polka, The Schottische, The Military Schottische, The Minor Two-step, Etc., MODERN DANCES, Tango, Fox-Trot, etc. It gives the steps of the GERMAN, Cotillion, Figures, Explanations, The Mysterious Hands, The Auction, The Rose, Blind Man's Bluff, The Scarf Dance, The Flower Dance, The Two Lions Dance, In the Canoe, Kneel, Serpent, Baskets' Grand Chain, Jerusalem etc. **10c postpaid.**

MAKE YOUR OWN RADIO

Enjoy the wonderful, fascinating hobby of radio. Learn all about it from interesting, instructive text reports, diagrams, and illustrations. Many surprising experiments. Only

RADIO SIENT shows how to make and operate inexpensive Radio Sets, the simplest one can be increased for a more elaborate one. Also tells how to build a short-wave Receiver for listening in forreign stations, police calls, ships at sea, etc. **ONLY 10c p-pd.**

Daisy Water Pistol

6-Shot Repeating Water Pistol, latest design; looks just like a Police revolver. Blue steel finish. Squirts 25 feet. When diluted ammonia is used is very effective against vicious dogs, tramps, animals 7 inches long. **PRICE 25c. POSTPAID.**

WONDERFUL X-RAY TUBE

A wonderful little instrument producing optical illusions both surprising and startling. With it you can see what is apparently the bones of your hands, to look in a loaf of bread and see the compound in tablets, or look through number 10c. **3 for 25c postpaid.**

Good Luck Ring 25c

Very sterling, quaint and uncommon. Silver finish shell and removable design, two initials, fortune and lucky good luck. Only genuine lucky good luck. **Only 25c postpaid.**

JOHNSON SMITH & CO.

Dept. 619 RACINE, WIS.

A copy of our NEW CATALOG mailed on receipt of 10c., or the 10c. is refunded with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Contains all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps. For all articles listed above. Canadian money, stamps, Postal Notes and British P. O. Orders accepted.

250 Magic Tricks

An excellent little book containing nearly 300 tricks for parlor or stage—such as: Coin tricks, card tricks, rope tricks, handkerchief tricks, egg, bottle, string, etc., tricks. Second Sight, Telegraphy, etc. Profusely illustrated. **10c postpaid.**

125 CARD TRICKS and sleight of hand. Contains all the latest and best card tricks as performed by professional magicians. Fully illustrated. Only 10c by mail postpaid. Large premium list free. **10c postpaid.**

SNAPPY JOKES. A splendid collection of rich and rare jokes, compiled by a jolly barrister for stag parties, smokers, etc. **10c.**

FORTUNE TELLING BY CARDS. Any one guesses, correct, etc. Gives amusing, startling and true information and lay them out etc. **Price 10c postpaid.**

LEARN TO HYPNOTIZE. Book tells how to hypnotize, with or without apparatus. Also lessons in self-mesmerism, hypnotism, telepathy, magnetism, personal magnetism, etc. **Price 10c postpaid.**

STAR TOY MAKER

Greatest boys' book written. Tells how to make a Pinhole Camera, a Canoe, Kaleidoscope, Electric Telephone, Boomerang, Toboggan, Instruments, Microphone, Talking Machine, Electric Motor, Electric Door Bell, Water Wheel, Puzzle Raft, a pair of Skis, Flying Hoop, Rabbit Snare, etc. 64 pages. 150 illustrations. **PRICE 10c.**

WIDGET BIBLE. Price 10c postpaid. Over 200 pages. Remarkable curiosity. Sold in Canada. Price 10c postpaid.

DREAM BOOK AND FORTUNE TELLER. Gives the meaning of dreams, with dictionary of dreams and interpretations, lucky numbers, fortune telling, palmistry, etc. **10c.**

HOW TO TIE KNOTS. 32 page book tells how to make different kinds of knots, splices, etc. 100 illustrations. **Price 10c postpaid.**

5-MINUTE HARMONICA COURSE. A new easy self-teaching method. Teaches how to play, to use the tongue, tremolo, fully illustrated. **Price 25c postpaid.**

BOY ELECTRICIAN

Book full of information, how to do it in simple language. How to make batteries, telephone, motor, telegraphs, bells, coils, batteries, telescope, microphone, electric engine, etc. Fully illustrated.

PRICE 10c postpaid.

PEA-MATIC REPEATER-12 SHOT

Here it is, boys. You can have an immense amount of fun with this new pistol. It shoots 12 to 15 ordinary peas without reloading. All you need do is to load the gun with peas, pull the trigger and keep on firing until the barrel is empty. Then reload and fire again. It is absolutely harmless and safe. Nothing to explode. These pistols sell like hot cakes, so get yours AT ONCE. Be the first boy in your town to own one of these automatic repeating pistols and be the envy of all the other kids in the neighborhood.

25c Postpaid.

PRICE ONLY 25 CENTS
Hiavver for Pneumatic 86c.

Auto Scare Bomb

The Auto Bomb is attached to the motor of your car, fastening one wire to the spark plug terminal and the other wire to any part of the motor to serve as a ground, then, instantly your "victim" steps on the starter, there is a shrill wnistle, followed by a loud bang. The driver thinks his car has exploded. Can be attached in a few seconds. Does not harm the car. Gives you more protection than an insurance policy—catches the thief in the act. **PRICE 15c Each, 3 for 40c.** *Shipped by Express, not prepaid.*

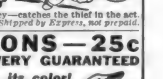
CHAMELEONS—25c

LIVE, SAFE DELIVERY GUARANTEED

Watch it change its color!

Get one of these most wonderful of all creatures. Watch it change its color. Study its habits. Wear one on the lapel of your coat as a novelty. Watch it shoot out its tongue and catch flies and insects for food. No trouble to keep. Can go for months without food. Measures about 4 inches in length. Shipped to any address in U.S.A. by mail. We guarantee safe arrival and live delivery. **PRICE 25 CENTS POSTPAID.** *Specially prepared Chameleon food 10c.*

BIG ENTERTAINER



326 Jokes and Riddles, 25 Magic Tricks, 10 Parlor Games, 75 Toasts, 13 Fairy Tales, 105 Moneymaking Secrets, 50 Miscellaneous, 21 Puzzles and Problems, 5 Comic Recitations, 10 Funny Readings, 11 Parlor Pastimes, 15 Flestations, 1110 Girls' and Boys' Names and their Meanings, 16 Picture Puzzles, 69 Amusing Experiments, Deaf and Dumb Alphabet, Shadowgraphs, Curses, Curious Toasts, How to Tell Fortunes with Cards, Dominoes, Dreams, Coffee Cups, etc. Numerous Tricks and Curious Puzzles with Coins, Dominoes, Pen and Pencil, 9 New Movements in Card Tricks, Crystal Gazing, etc.

ALL FOR 15 CENTS POSTPAID. *Big novelty catalog 10c.*

BLANK CARTRIDGE PISTOL

REVOLVER STYLE

Three new models now ready. **25c, 50c and $1.00.** Will not injure and are effective. Modelled after latest models of type of Revolver. Appearance and weight. Revolver takes .22 Cal. Blank Cartridges obtainable everywhere. Great protection against burglars, tramps dogs. Many fellows without a dog or country attached to other residents. **Fine or 4th July. Now ready for your work, starting right, etc.**

SMALL SIZE 4 in. long 25c. MEDIUM SIZE 5 in. long 50c. LARGE SIZE 6 in. long $1.00.
BLANK CARTRIDGES 50c per 100. HOLSTER (Cowboy type) 50c. Shipped by Express only not prepaid. *Big novelty catalog 10c.*
JOHNSON SMITH & CO., Dept. 619, Racine, Wis.

YOU NEED THIS FREE HOME REPAIR BOOKLET

Contains diagrams and simple instructions for emergency and routine repairs that every home and auto owner can **should** *make himself. Revised edition, greatly enlarged and completely rewritten. Get a copy for your workshop.*

BE THRIFTY—do your own work—and keep the money otherwise paid to plumbers, repair men and for new parts.

With Smooth-On No. 1, you can stop leaks at joints, seams and cracks in pipes, boilers, heating systems, tanks, pails, auto radiators, water jackets and crank cases, tighten loose parts, reset stripped screws, bolts and nuts, and make dozens of other equally practical repairs—all at almost no cost, and in emergencies without the delay of waiting for outside help.

Smooth-On No. 1 is applied without heat or special tools, hardens into metallic iron and holds permanently under any pressure and on any metal, masonry, wood and tile. Leading power and industrial plants have used it for 35 years, and with this new booklet as a guide, you can make equally successful applications.

When you know where and how to apply Smooth-On No. 1, you will make constant savings. Be prepared. Ask us for the booklet and buy Smooth-On No. 1 in 7-oz., 1-lb. or 5-lb. can from your hardware store.

Do it with SMOOTH-ON

SMOOTH-ON MFG. CO., Dept. 69,
574 Communipaw Ave., Jersey City, N. J.

Please send the free Smooth-On Repair Book.

Name .....

Address .....

3-35 .....

When You Change That Boat

[*Continued from page* 103]

whale boat or other boats of the double end type are the most seaworthy. The sharp bowed, wide sterned boats in most cases are the most unseaworthy.

Modern styles have dictated certain definite exterior appearances for yachts. Most every amateur that remodels a boat tries first of all to get full headroom in his cabin. If your boat is under thirty feet in length, don't try it; the finished product will look too high, very likely have a bad roll. A leading naval architect once remarked, "What good is headroom, anyway? The first thing you do when you get into a cabin is to sit down."

If a cabin is really necessary on our boat, we must either design one that will accommodate us, or get a boat large enough to put a decent cabin on.

The best insurance against homely appearances and uncomfortable quarters is a definite plan of operations before you begin. A scale drawing of the completed alterations is by far the best guide.

Strength is necessary in any boat that is to "take it" in a seaway. A good rule to follow in making additions to a boat is to have all new frame members the same size, or larger than, those originally in the boat.

Winners of First Home Contest

[*Continued from page* 53]

tition across one end of the room, about 6' from the wall, using 2"x2" studding covered with tile-shaped insulation board in bright and varied colors. Walls and ceiling of the room are covered with the same material.

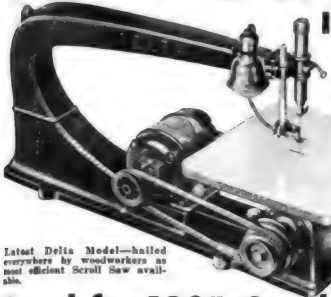
If puppet shows are to be put on, a stage can be built, and a row of floodlights installed. Otherwise just place a silver screen for movies at the back of the stage opening. A curtain with pull cord is highly desirable here.

Opposite the stage, benches and shelves may be built in for use as a study or "Bridge Nook." Make the benches 15" wide and 18" above the floor, then cover with pads of the same material used for drapes.

A ping pong table suspended from the ceiling by four ropes forms a reflector for the six ceiling lights in the center of the room. Sash weights running behind the walls and connected with ropes counter-balance the weight of the table.

Two wooden horses, used in place of legs, make the playing surface more rigid. For the table top use any heavy grade of wall board, and place decorative panel striping on the bottom side. The table when up reflects light back against the ceiling, softening the illumination of the room; when down, light is directed on the playing table, where it is needed.

New Scroll Saw



Latest Delta Model—hailed everywhere by woodworkers as most efficient Scroll Saw available.

Increased Efficiency —New Features

This new "Delta" Scroll Saw is another great step forward in scroll saw performance. Enables you to use *fine* blades at *full motor speed* without danger of breakage. Has many other novel and useful improvements. This year the Delta line of motor-driven woodworking tools is more complete than ever before. Delta standards of efficiency, quality, and convenience have been strictly maintained—and Delta prices still kept at their low levels. Good compact motor-driven tools are within the reach of all. Every woodworker will find the new 1935 Delta line of unusual interest.

Send for 1935 Catalog of "Delta" Tools

The 1935 catalog of Delta quality motor-driven tools is now off the press. It is crowded with photographs and information about the new line of 1935 Delta tools. It shows how Delta tools are built to stand the grind of production work, and yet are so low priced as to be within the reach of all. Send coupon so your name will be placed on the mailing list to receive the 1935 Delta catalog without delay. Enclose only 10c at same time for Book of Practical Delta Projects, 32 pages of new and novel things to make with many blue prints, working drawings, photographs and illustrations—and complete directions.

Delta Manufacturing Co.

3775 N. Holton St., Dept. M335, Milwaukee, Wis

DELTA MANUFACTURING COMPANY
3775 N. Holton St., Milwaukee, Wis. Dept. M335

I enclose 10c (stamps or coin), for which please send me one copy of "Practical Delta Projects." Also place me on your mailing list to receive 1935 Delta catalog of quality motor-driven woodworking tools.

Name..... Age?.....

Address.....

City..... State.....

☐ Check here if you are a Delta user now.

This may be your

BIG OPPORTUNITY

Become an expert PHOTOGRAPHER. Growing demand for trained men and women. Wonderful money-making opportunities. Lifetime career. Learn quickly. COMMERCIAL, NEWS, PORTRAIT or MOTION PICTURE PHOTOGRAPHY. Personal attendance or Home study courses. 25th year. Free Booklet.

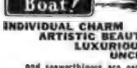
New York Institute of Photography
10 West 33rd St. Dept. 333. New York

Earn Cash at Home!

Grow fancy giant mushrooms in cellar, attic, barn. New, easy, odorless method. We show you how, furnish guaranteed materials and buy crops. Valuable big book and pictures free if you write quickly. (Est. 1908.)

UNITED MUSHROOM CO.
3848 Lincoln Ave., Dept. MM-3 Chicago

Fast Runabouts—Cruisers—Outboards



Row Boats—
Tenders, Sail Boats, Canoes

INDIVIDUAL CHARM
ARTISTIC BEAUTY
LUXURIOUS COMFORTS
UNCHALLENGED SPEEDS

and seaworthiness are easily recognized in the **Germain-Craft**

Boating is clean, healthful sport and building your own boat from our building plans and instructions, full size paper patterns, or semi-erected frames and ready cut materials is a profitable pleasure. Twenty-five models to choose from. Germain boats are backed by more than thirty-four years of careful designing and the construction of many of the finest pleasure and racing craft produced in this country.

Send 10¢ CIRCULAR

GERMAIN BOAT COMPANY
906 S. Niagara Saginaw, W. S. Michigan

TRIAL LESSON In Free DRAFTING

FREE TRIAL LESSON

Tear out this ad, sign your name and address and mail it to address below for FREE TRIAL LESSON in DRAFTING. Prove to yourself how easy it is to learn AT HOME to make Mechanical, Electrical, Architectural or Structural Drawings. DRAFTING is the key to the best paid positions in industry. New opportunities now opening. Get an early start toward a good position while learning in spare time at home. We furnish all tools, etc. Send now, TODAY, for your FREE TRIAL LESSON.

CHICAGO TECH COLLEGE
The Success School for Draftsmen
C-267 Tech Bldg., 118 E. 26th St., Chicago, Ill.

4900
Chemical Formulae
In This One Indispensable Book

In this one big book you have at your fingertips practical commercial formulae for making thousands of useful products for your own use and for profitable manufacture. Brand new, encyclopedic in scope, arranged for quick reference, it is exactly the book that every commercial chemist, large or small, has long wanted. 600 Meaty Pages of formulae including many patented, scarce and little known processes, many published for the first time. *Collected by over 60 outstanding industrial chemists and technicians—every formula proved successful by actual test and experience.*

Covers Hundreds of Industries
Thousands of Products

You will find, in The Chemical Formulary, methods for making or using:

Abrasives, Adhesives, Air Conditioning, Alloys, Anti-rusts, Aromatics, Asphalt, Bronze Lacquers, Candles, Candy Glaze, Carbonizing, Catalysts, Celluloid, Cement, Cream, Cold, Coffee Substitutes, Colors for Oils, Decolorizing Preparations, Dental Cement, Depilatories, Disinfectants, Dyes, Electrotyping, Etching, Fumigants, Compounds, Explosives, Fertilizer, Fireproofing, Fireworks, Fluxes, Fly Killer, Food Specialties, Gems, Artificial, Glass Polish, Glues, Gold Plating, Grease, Lubricating, Hair Setting Liquids, Hair Tonics, Incense, Inks, Insulation, Jams and Jellies, Kalsomine, Lacquers, Latex Paint, Leather Polishes, Liniment, Liquors, Lubricants, Matches, Metallic Printing Matrix, Rubber, Mirrors, Nickel Plating, Oil, Sun-Tan, Ointments, Paints, Patent Leather, Photographic Specialties, Polish, Auto, Porcelain, Preservatives, Printing, Refrigerants, Rubber, Synthetic, Safety Glass, Shaving Cream, Soaps, Solvents, Sweets, Tooth Paste, Waterproofing, Zinc Etching, Zinc Plating, and thousands more

ONE FORMULA ALONE MAY BE WORTH HUNDREDS OF DOLLARS TO YOU

Every formula in this book is of practical, commercial value. The volume is not merely a collection of "household stunts" or experiments for the amateur, but a mine of money-making ideas for everyone concerned with commercial chemistry. In addition, you will find it a quick-reference book for a vast amount of information that you need in your daily work. Send for your copy today.

EXAMINE IT FREE *Send No Money Mail This Coupon*

D. VAN NOSTRAND CO.,
250 Fourth Ave., New York

Send me on approval The Chemical Formulary. Within 5 days after I receive it, I can return it to you and owe nothing. If I keep it I will send you $2.00 as first payment and I will pay $2.00 monthly thereafter for 2 months—$6.00 in all. (3% discount for cash. Same return privilege.) (3d. M. 3-35.)

Name .....

Address .....

City ..... State .....

Reference .....

Address .....

Modernize Home at Small Cost

[*Continued from page 85*]

Here, in brief, is what was done. The present porch and front dormer were removed. Fortunately, the main roof was of steep pitch —45°—and this fitted in nicely with the English architectural style. The wide overhang was cut off and a simple closed cornice substituted. A large half-timbered gable was placed in front with stone veneered walls to the top of the first story. This addition projects 4 feet beyond the former front wall of the house. To obtain more space, the living room was extended 10 feet toward the south.

The upstairs sleeping porch was added on the south side. Since the new front gable increased the floor area here, this added space, greatly improved the front bedroom, and also improved closet accommodations.

Brown stained cedar shingles were applied to all pitched roofs. Gray stained cedar shingles, 24" long, were laid over the old sided walls with an exposure of about 10" to the weather. Locally quarried limestone was used for the stone veneer. Cement stucco, ivory color, was laid on metal lath.

An example of modernization with a farm setting is also shown herewith. Figure 5 shows a large, rambling farm home, getting along in years. Figure 6 shows the same home after it had been brought up-to-date.

Sharp Shooting On the Alleys

[*Continued from page 57*]

ground. The results are usually ordinary or less than that.

Another group picks out a spot just beyond the foul line and another spot half or three-quarters of the way to the head pin and endeavor to send their ball over both spots. This method approaches precision, but it is a bit involved.

Spot Bowling

The vast majority of good bowlers use a method known as "spot" bowling. They pick a spot on the foul line from which their particular style of delivery works best and are extremely careful to see that the ball starts from that spot every time. The "spot" bowler always starts for the foul line from the same position on the alley, goes to the line at the same speed, and uses the same back swing. After the ball has left his hand, he watches it carefully, checking the angle of roll and makes necessary corrections when he fails to obtain a strike.

There are three standard types of delivery —the straight ball, the back-up ball, and the hook-ball. The straight and back-up balls are the easiest for the novice to control. The hook-ball, while the most effective strike

[*Continued on page 126*]

$200 First Week In OWN Business

We want a reputable, honest man in each county. This man does not need to have any special experience or more than ordinary ability, but he must be honest and courteous.

Such a man we will start in business for himself. You can make far above average profits in the rug-cleaning business—a high-grade business all your own. Many earn $125 to $200 per week—*some considerably more*. L. A. Eagles took in $200 his first week in Madison, Wis. No shop necessary. The H-B rug-washer finishes rugs like new on the customer's floor. There are hundreds of customers—in your vicinity and nearby towns.

The H-B rug-washer is very simple. Anyone can run it. Electricity does the work. Simply clean a few rugs. These customers tell others and also give you their future work. Soon you will have a prosperous year-around business. **Send coupon for booklet explaining everything.**

"Monthly Profits $400"

C. R. Bergseth writes, "My profits run about $400 every month." M. O. Malmin earned 3 times the cost of his machine the first two months.

"Never a Complaint"

C. J. White says: "$100 business in six days—never a complaint." That is the nicest part of this business—**every customer is more than satisfied.** Stains and blotches disappear and vivid colorings and freshness in faded floor coverings come back.

"Profits Pay for Home"

Harry Hill built and paid for a home from rug-washer profits. His first day's business was $86. You, too, can enjoy a large income. H. Riley says: "One job, about 13 hours work, brought in $75."

Backed by $58,000,000 Company

Every H-B rug-washer is guaranteed by a 127-year-old $58,000,000 company. You take no risk. This method has been successful 12 years. H-B rug-washers are used by United States government and by Statler and other leading hotels. They are GUARANTEED.

Easy Terms

The complete equipment is inexpensive. A reasonable down payment brings everything to you and the balance is paid monthly. From the start, you have your own business—one that is profitable and of which you can be proud.

Free Book—*Mail Coupon* NOW!

H-B Co., 6253 H-B Bldg., Racine, Wisconsin.

Gentlemen:—Send at once (no obligation) your free booklet illustrating rug-washer and telling how I can own my own business; how I can earn large profits at prices below other methods; how I can enjoy a permanent year-around business; how I can become financially independent in a very short time; and how I can pay on easy terms.

Name .....

Address .....

City ..... State .....

Boys! Let me show you how to make your own metal toys. Many are making money selling all they can mold. Become a Master Metal Caster. Join the Uncle Gus Metal Casting Club FREE. Write for information.

"ACE" $1 SPECIAL

One soldier "Ace" Mold, "Ace" Mold Base, "Ace" Mold Handles, package of "Ace" Metal, and a *free* package of "Ace" Metal Magic. Send $1 with order. Postpaid anywhere in U. S. A.

UNCLE GUS DEPT. IB TOLEDO, O.

WORLD WIDE ALL WAVE RADIO

Get stations all over the world with this POWERFUL All-Wave radio receiver! Works on two inexpensive batteries. NOT a toy or set-to-build. **Results Guaranteed!** Ace kits include all parts mounted on attractive metal chassis and panel. Clear picture instructions. Wire it yourself! It's easy! **One Tube Kit—$1.95. Two Tube Kit—$2.95. Three Tube Kit—$3.95.** Just add DC type tubes, batteries, speaker (if not included). Complete kit—**$3.65.** Kits wired **75c** extra. Tubes **85c** ea. Dandy headphones **$1.25.** ORDER NOW! Send **$1.** deposit, or postpaid if full remittance. Send for literature.

FREE!! Large three-color map of the WORLD. Valuable Short Wave data, etc. Send 10c for handling. NOW!

ACE RADIO LABORATORIES Dept. HB3 **1919 Broadway New York City**

DRAFTING LEARN AT HOME

F. E. Kyno was "a poorly paid clerk" when he enrolled for the home-study Drafting Course of the International School of Drafting. Through study and perseverance he became Chief Draftsman of the U. S. Steel Furniture Co. He is now earning more in a day than he used to earn in a week.

A. J. Hutchins became Chief Draftsman for the American Strawboard Company and increased his salary 300% — also as a result of our training.

There is no doubt that Drafting offers a real opportunity to ambitious men and it will pay you to investigate it. Mail coupon for free booklet.

INTERNATIONAL SCHOOL OF DRAFTING

Division of the International Correspondence Schools

Box 2318-C, Scranton, Penna.

Without cost or obligation, please send me full details of your home-study course in

☐ Mechanical Drafting ☐ Structural Drafting
☐ Architectural Drafting ☐ Ship Drafting

Name .....

Address .....

JOHNSON'S latest and greatest contribution to outboard motoring – embodying advanced features of aeronautical design – offering new compactness, easier portability, greater power, easy starting, flashy performance. It's the talk of the industry! Write for illustrated Handy Chart, describing this new Sea-Horse Aero-Built 300 and the 5 other great motors in the '35 Sea-Horse line. Just off the press.

JOHNSON MOTOR CO., 700 Pershing Rd., WAUKEGAN, ILL.
Canadian Johnson Motor Co., Ltd., Peterboro, Canada

FREE!

JOHNSON SEA-HORSES

CREEK CHUB'S NEW BAIT BOOK

TELLS HOW TO CATCH MORE & BIGGER FISH

Chock-full of helpful pointers and many fishing facts, this New Bait Book describes in detail how, when, where and why Creek Chub True-to-Nature Lures, such as the Famous Pikie Minnow and other Creek Chub Lures and Flies—not only Catch More and Bigger Fish—but also many World's Records! Beautifully illustrated. It's yours for the asking!

FREE

CREEK CHUB BAIT COMPANY, 433 Randolph St., Garrett, Ind.

Falconry Is Newest Hunting Sport

[*Continued from page 75*]

American duck-hawk—a blue-gray, long-winged, hook-beaked creature with a wing-span, when fully grown, of three feet.

Having discovered a nest, you observe it with a telescope to find out the habits of this particular brood. It is imperative that the chicks or eyases, as they are called, be taken just at the moment before they begin to fly. If they ever "get their wings" in freedom, the task of training them is much more difficult.

The eyas, once captured, should be immediately taken home in a soft padded container, and released in an absolutely dark room. Never keep a falcon in a cage; he will destroy himself by his assaults on the bars. It is important that the bird be kept in utter darkness for the first few days because this reduces the visible number of strange new objects and prevents the onset of a jerky, nervous disease known as "bating." Before the bird is taken out of the dark room, a soft leather hood is placed over his eyes. This hood must fit snugly.

At the same time, strips of leather known as "jesses" are fastened to his legs just above the foot. These jesses are joined to a swivel attachment to which a leash is fastened. Small bronze bells are also secured to each foot.

The hawklet is now ready for his first lessons. Hooded and belled, he is carried on the gloved hand of his trainer for several hours a day to accustom him to his perch on his master's fist. Gauntlets should be worn to minimize the danger of injury from the bird's sharp beak and talons. The young bird is stroked with gentleness. Speak softly to it with the hood over its eyes. Some trainers constantly smoke a pipe in front of the bird for the first three days and nights. The smoke

[*Continued on page 128*]

NOW! A Make-it-Yourself Fishing Rod Kit

Accept This Amazing Offer! Mail Coupon Now!

FIRST KIT OF ITS KIND EVER OFFERED! Contains everything you need to build a popular one-piece solid steel fishing rod. Amazingly low cost. Easy to assemble in a few minutes of fascinating work. Simple diagram instructions furnished. Send for your GEP-KIT now. Enjoy the big thrill of hooking fish on a rod of your own making. Use the convenient coupon. KIT will be sent to you at once, prepaid.

$1.50

WE PAY POSTAGE

Here's what you get for your money!

1. Solid Steel Rod
2. Top Tip
3. Guide
4. Guide
5. Winding Wire
6. Solder
7. Reel Lock
8. Drop Handle
9. Forward Grip
10. Hand Grip
11. Butt Plate
12. Instructions

If not interested in building a rod, ask your nearest dealer to show you the complete line of famous GEP-RODS. If your dealer does not handle GEP-RODS, send his name and address to us at once.

Gephart Manufacturing Co., 220 W. Illinois St., Chicago, Ill.

Enclosed find money order for $1.50 for GEP-KIT containing everything necessary to build durable steel fishing rod, as shown.

NAME .....

STREET .....CITY .....

DEALER'S NAME .....

Thompson BEATS the World on BOATS

Better Built Lower Prices

Canoes $48 and up

Rowboats $36 and up

Outboards $42 and up

Very fast utility model

Only Boats With Full Length Spray Rails

Keep passengers perfectly dry—even at high speeds. Catalog shows entire mail boat complete with sail for $183. Two big factories. Prompt shipment.

CATALOG FREE

Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (TD)
230 Ann St., Peshtigo, Wis. (Write to) 130 Elm St., Cohasset, Mass. N. Y.

Print Your Own

Cards, stationery, advertising, labels, paper, circulars, tags, etc. Save money and time. Sold direct from factory only. **Junior Press, $5.50.** Job Press, $11. Power, $149. Do popular raised printing like engraving with any of our presses.

Print for Others, Big Profits

Pays for itself in a short time. Easy rules sent. Write for free catalog of outfits and all details.

The Kelsey Co., 849 Meriden, Conn.

CARTOON YOUR WAY TO SUCCESS!

DON'T COPY - LEARN TO ORIGINATE!

RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you can SELL! Course has 24 lessons and 600 illustrations. **$2.85**

Send name and address for free details. Do it now!

RAYE BURNS SCHOOL, Dept. F-X808 2194, CLEVELAND, OHIO

LEARN TO DANCE $1

Why be a lonely unpopular wall-flower when you can learn all the smart dances from the most modern to the old favorites—right at home, in private without teacher, music or partner? Complete course only $1; so simple even a child can learn quickly. Send stamps, cash or M. O. Complete course—all 6 lessons, $1.98 (C. O. D. orders 25c extra and postage.) FREE a rare Lucky Chinese Coin.

FRENCH ROY, Box 131, Varick Sta. New York, N. Y. Dept. 100

NERVOUS? WORRIED? UNHAPPY?

ARE YOU

What's wrong with you? Do symptoms of Constipation, Indigestion, Dizzy Spells, Sweating and Sleeplessness keep you irritable, exhausted and gloomy? Are you Bashful? Despondent? *There's Help for You!* Medicines, tonics or drugs probably will not restore your weak, sick nerves. My wonderful book *Vitalize Your Nerves!*, explains a new method that will help you regain lost vitality and healthy, nerves. Send 10c (coin) today. NERVALIN LABORATORIES, 133 Fulton Bldg., Jersey City, N. J.

NEW ANGLE VISE HAS NO ONLY DUPLICATE $5.95

A new invention—at the lowest price in the field. The *Palmgren Angle Vise*—*accurately graduated in degrees*—for all production, tool and general shop use, saves hours in welding and setting up jobs, making jigs and fixtures. Has at it possible to cut, drill or grind *at any angle* by means of one quick, simple adjustment. Has greater strength and holding capacity than ordinary vises. Jaws, thicker, wider. 10-IN. SPECIAL LIMITED OFFER—only $5.95 plus postage. Or, send $5.00, pay postman on delivery. Send for free catalog.

Chicago Tool & Engineering Co., Dept. M, 6366 S. Chicago Av., Chicago, Ill.

Base ordinary vises. Width for Construction guaranteed.

$318 Have Fun—Save Money

Build Your Own Trailer

Hundreds built from our easy-to-understand plans. Send dime for ILLUSTRATED BROCHURE of new 1938 designs and plans, English and American. NEW IDEAS!

"Silver Cloud"

"Bullet" Model (Smaller to pull behind car) Specially designed to be easy and cheap to build. Uses Model T or similar Ford parts now available anywhere for $33 complete. Light, strong, 2, 3 or 4 table, tool, store, wardrobe. Send dollar bill for building instructions, genuine Fir Plywood, material lists. Big bargain.

AIRSTREAM TRAILER CO. 134 So. St. Andrews Place Los Angeles, Calif.

The NEW SPARE TIME Training . . . . . that leads to

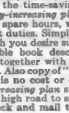
BIGGER PAY!

DO you want a better position and a higher salary? You can have them if you can do the work. LaSalle experts will show you how, guide you step by step to success and help solve your personal business problems through the time-saving LaSalle Problem Method. Our *salary-increasing plan* enables you to prepare during your spare hours, without interference with your present duties. Simply mark on the coupon the field in which you desire success, and we will mail you a valuable book describing the opportunities in that field, together with an outline of our *salary-increasing plan*. Also copy of "Ten Years' Promotion in One." There is no cost or obligation. Find out how the *salary-increasing plan* starts a average men and women on the high road to success and financial independence. Check and mail the coupon NOW.

Find Yourself Through LaSalle!

LaSalle Extension University

Dept. 3493-R Chicago



Please send me full information regarding the Problem-Method course and service I have marked with an X below. Also a copy of "Ten Years' Promotion in One" all without obligation to me.

- ☐ **Business Management:** Training for Official Managerial, Sales and Departmental Executive positions.
- ☐ **Modern Salesmanship:** Training for position as Sales Executive, Salesman, Sales Trainee, Sales Promotion Manager, Manufacturers' Agent, and all positions in retail, wholesale or specialty selling.
- ☐ **Higher Accountancy:** Training for position as Auditor, Comptroller, Certified Public Accountant, Cost Accountant, etc.
- ☐ **Traffic Management:** Training for position as Railroad or Industrial Traffic Manager, Rate Expert, Freight Solicitor, etc.
- ☐ **Law:** LL. B. Degree.
- ☐ **Banking and Finance:** Training for executive positions in Banks and Financial Institutions.
- ☐ **Modern Foremanship:** Training for positions in Shop Management, such as that of Superintendent, General Foreman, Shop Foreman, Sub-Foreman, etc.
- ☐ **Industrial Management:** Training for Works Management, Production Control, Industrial Engineering, etc.
- ☐ **Personnel Management:** Training for Personnel Manager, Industrial Relations Manager, Employment Manager, and positions in Employee Service.
- ☐ **Modern Business Correspondence:** Training for Sales or Collection Correspondence, Sales Promotion Manager, Mail Sales Manager, Secretary, etc.
- ☐ **Stenography:** Training in the new superior machine shorthand, Stenotypy.

- ☐ Railway Station Management
- ☐ Effective Speaking
- ☐ Expert Bookkeeping
- ☐ C. P. A. Coaching
- ☐ Business English
- ☐ Stenotypy—Stenography
- ☐ Commercial Law
- ☐ Telegraphy
- ☐ Credit and Collection Correspondence
- ☐ Paper Salesman's Training

Name..... Age.....

Present Position.....

Address.....

Something new in Portables

CORONA
SILENT

Here's the typewriter for you! Has everything—new silencing principle, effortless Smith Floating Shift, piano key action, interchangeable platens, standard keyboard, sturdiness, speed.

200 words a minute

written on Corona Silent by speed expert at N.Y. Business Show. Learn about this handsome Corona and the two other fine Corona models.

FREE TRIAL - EASY TERMS

Here's the coupon!

L. C. SMITH & CORONA TYPEWRITERS INC
733 E. WASHINGTON ST., SYRACUSE, N. Y.
Send me free folder describing the new Corona Silent, Corona Sterling, Corona Four.

Name.....

Address.....

.....

QUALIFY for GOOD JOBS

DIESEL
and AUTO TRAINING

Trained men needed. Demand for Auto-Diesel experts to operate and service trucks, tractors, trains, boats, airplanes, power shovels, etc., grows every month. To qualify for good jobs, you must first become trained. This can be done in a few months at National. Qualify you as Auto Mechanic, Auto Electrician, Battery Expert, Carburetor Expert, Diesel Mechanic, Diesel Service Man, Fuel Injection Expert, Ignition Electric, etc.

Oldest, Largest Trade School in West
Est. 1906. 30,000 graduates. Finest equipment—late model autos and Diesel engines to work on.

Earn Room and Board
We assist students to obtain part time job during training. We allow coach railroad fare from any part of U. S. to Los Angeles.

SEND COUPON FOR FREE AUTO-DIESEL BOOK

NATIONAL
AUTOMOTIVE SCHOOL
Los Angeles

Dept. S MMA, 4006 South Figueroa St.
Send Free Auto-Diesel Book and Special offer.

Name.....

Address.....

City..... State.....

Sharp Shooting On the Alleys

[*Continued from page* 122]

producer, is very hard to control and cannot be used efficiently without continuous practice.

A set style of play is important. The man who ambles to the line and sends his ball doddering down the alley may be just as effective as the active speed-ball merchant—they vary only in style.

Beginners should pick up a set style early and stick to it. A variation of impressions is only confusing.

How to Score

Scoring in bowling is not as complicated as many persons believe. A bowler is allowed two balls in each frame or inning with which to knock down the ten pins. If he makes them all with his first ball, he is given a strike, whereupon he makes the mark (x) in the small right hand square and adds to the ten for that frame the number of pins he makes with his next two balls. Thirty is the maximum for any frame, and is made if the bowler gets three consecutive strikes—10 for his original strike and 10 more for each strike on his two successive balls.

If the bowler requires two throws in a frame to get the ten pins it is a spare using the mark (/) and he receives his 10, plus the pins he makes with his next ball. The maximum on a spare is 20, and is made when a spare is followed by a strike.

If one or more pins remain after two attempts in one frame it is a miss or blow using the mark (-) and he receives only the number of pins he makes in that frame.

A specimen score is illustrated. It shows that the bowler had this success in one specific game.

In the first frame, he scored a strike, followed by strikes in the second and third. The first strike is worth ten plus the number of pins knocked down with the next two balls. In this case, it was 20, making a total of 30 for the first frame. In the fourth frame, the bowler got eight pins with his first ball. This added to ten for the strike in the third and ten for the strike in the second frame makes 28 for the second frame plus 30 in the first or 58, the total score up to the second frame.

There was a blow in the fourth frame, the bowler getting only nine pins with two balls or 19 for the third frame. This makes the score 77 and 86 for the third and fourth frames. Ten pins with two balls went down in the fifth, and the scorekeeper marked up only the spare marks until the first ball in the sixth was bowled. This was a strike, adding 20 points to the score in the fifth.

The remaining frames were scored in a similar manner.

NEW LOW PRICES

GOODRICH · Firestone GOOD YEAR U.S., FISK and OTHERS

$2.15

29 x 4.40 - 21

SAVE ON TIRES

Remember

12 MONTHS WRITTEN GUARANTEE BOND WITH EVERY TIRE

YOU CAN'T BEAT OUR PRICES

And we defy anyone to excel our quality. Every standard brand tire reconstructed by our modern method is positively guaranteed to give full 12 months' service under the severest road conditions. This guarantee is backed by our entire financial resources.

Buy Now Before Prices Advance!

BALLOON TIRES

Size	Rim	Tires	Tubes
29 x 4.40	21	$2.15	$0.85
29 x 4.50	20	2.35	.85
30 x 4.50	21	2.40	.85
28 x 4.75	19	2.45	.95
29 x 4.75	20	2.50	.95
29 x 5.00	19	2.85	1.05
30 x 5.00	20	2.85	1.05
28 x 5.25	18	2.90	1.15
29 x 5.25	19	2.95	1.15
30 x 5.25	20	2.95	1.15
31 x 5.25	21	3.25	1.15
28 x 5.50	18	3.35	1.15
29 x 5.50	19	3.35	1.15
30 x 6.00	18	3.40	1.15
31 x 6.00	19	3.40	1.15
32 x 6.00	20	3.45	1.25
33 x 6.00	21	3.65	1.25
31 x 6.50	19	3.60	1.35
32 x 6.50	20	3.75	1.35

TRUCK BALLOONS

Size	Tires	Tubes
7.00—20	$8.95	$2.95
7.50—20	6.95	3.75
8.25—20	8.95	4.95
9.00—20	10.95	5.65

Regular CORD Tires

Size	Tires	Tubes
30 x 3	$2.25	$0.65
30 x 3½	2.35	.75
31 x 4	2.95	.85
32 x 4	2.95	.85
33 x 4	2.95	.85
34 x 4	3.25	.85
32 x 4½	3.35	1.15
33 x 4½	3.45	1.15
34 x 4½	3.45	1.15
30 x 5	3.65	1.35
33 x 5	3.75	1.45
35 x 5	3.95	1.55

Heavy Duty TRUCK

Size	Tires	Tubes
30 x 5	$4.25	$1.95
34 x 5	4.25	1.95
32 x 6	7.95	2.75
34 x 7	10.95	3.95
36 x 6	9.95	3.95
36 x 8	12.45	4.25
40 x 8	15.95	4.95

All Other Truck Sizes

ALL TUBES ARE GUARANTEED BRAND NEW

Send Only $1 Deposit on each tire. (On each Truck Tire send a $4 deposit.) We ship balance C. O. D., 5 per cent discount for full cash with order. Any tire failing to give 12 months' service will be replaced at half price.

GOODWIN TIRE & RUBBER CO. Dept. 1502
1840 S. MICHIGAN AVE., CHICAGO, ILL.

WE WANT DEALERS

DIESEL the NEW POWER

The whole world gasped at the amazing performance of the Diesel Powered Burlington Zephyr train. It opens a new era of power efficiency. Aeroplanes, automobiles, great industrial plants may soon be using these marvelously efficient engines.

It means a new profession, a new trade for thousands and thousands of men. Learn Diesel operation, construction and repair NOW. Use our magical quick reference method. Find out all you need to know through this great encyclopedia which we send free for examination.

4 BIG BOOKS SHIPPED FREE

for examination. There are no strings to this offer. If you really want to get into the most promising new field of the century—the livest—most up-to-date—most talked of profession, send for these books on our amazing free shipment offer. Read them, examine them, test them in any way and then if you are not sold 100% send them back at our expense and you won't owe one cent.

American Technical Society, Dept. O-3320
Drexel at 58th Street, Chicago, Illinois.

Send me the Big 4 Volume Diesel Engineering Library for 10 days FREE examination. I will pay the few cents express but don't owe you a cent unless I keep the books, in which case I agree to send $2.00 in 10 days and $3.00 a month until the introductory price of only $19.80 is paid.

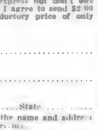
Name .....

Address .....

City ..... State .....

Please attach a letter giving age, occupation and the name and address of at least one business man as reference.

Standard & Walsh Garden Tractors



Plow, Seed, Cultivate, Mow Hay and Lawns

Powerful Tractors for Small Farms, Gardeners, Florists, Nurseries, Fruit and Poultry Men.

1 & 2 Cylinder Models

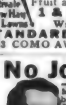
Write for *Free Catalog*

STANDARD ENGINE CO.
4613 COMO AVENUE. MINNEAPOLIS, MINN.

No JOKE To BE DEAF

—Every deaf person knows that—

Mr. Way made himself hear his watch tick after being deaf for twenty-five years, with his Artificial Ear Drums. He wore them day and night. They stopped his head noises. They are invisible and comfortable, no wires or batteries. Write for TRUE STORY. Also booklet on Deafness.



Artificial Ear Drum

THE WAY COMPANY
741 Hofmann Bldg. Detroit, Michigan

Kidneys Must Clean Out Acids

The only way your body can clean out Acids and poisonous wastes from your blood is thru 9 million tiny, delicate Kidney tubes or filters, but beware of cheap, drastic, irritating drugs. If functional Kidney or Bladder disorders make you suffer from Getting Up Nights, Nervousness, Leg Pains, Backache, Circles Under Eyes, Dizziness, Rheumatic Pains, Acidity, Burning, Smarting or Itching, don't take chances. Get the Doctor's guaranteed prescription called Cystex (Siss-Tex). Works fast, safe and sure. In 48 hours it must bring new vitality, and is guaranteed to fix you up in one week or money back on return of empty package. Cystex costs only be a day at druggists and the guarantee protects you.

Ideas For Amateur Stage Builders

[*Continued from page* 95]

dip odd scraps of cloth left over from earlier scenery jobs and apply the cloth to the wire. Apply cloth smoothly, cutting it with scissors as you go around corners. When the rocks are dry paint them in any color you desire.

The first step in constructing stage props from papier mache is to model the object desired out of clay or plasticine on a modelling board. Then make a simple wooden frame deep enough to cover the model and place around it. Paint the model, the board on which it rests, and the inside of the frame either with sweet oil or a strong solution of ordinary soap to prevent the plaster of Paris from sticking. Pour in a thick, creamy mixture of plaster of Paris and allow it to harden. When hard, remove the clay and you have the negative mold. Paint its interior with sweet oil or soap. Tear newspapers or old wrapping paper into narrow strips and dip them in glue, covering the interior of the mold completely to a depth of about one eighth of an inch. When the glue is completely dry, remove carefully from the mold with a thin knife and paint.

Falconry Is Newest Hunting Sport

[*Continued from page* 124]

is believed to act as a soothing drug on the bird, and also impresses it with the constant presence of its master.

The first feeding is given by candlelight at the end of 48 hours. The mild glow of the candle does not frighten the bird when the hood is taken off for the first time. Small strips of fresh raw beef, warmed slightly, and held in the trainer's fingers, are fed to the bird. Before the end of the meal the hood is replaced, so that the hawk will not associate hooding with the end of his dinner.

After a week or ten days of "carrying" the bird and feeding him by candle-light (he has meanwhile been exposed to other objects, sounds, and persons, quite gradually) he is introduced to the "lure," a very important part of his education. The lure is a rough imitation of a bird, attached to the end of a thirty-foot string. To make a lure, you take a weighted leathern disc and attach pigeon wings to it, in order to give it the appearance of reality. In the center of the disc, some fresh meat is fastened; for the next week or more, all the hawk's meals are given to him, unhooded, on the lure—which he gradually learns to associate with feeding.

Now comes the first step in teaching the hawk to attack. Food is placed in the center of the lure, and it is then thrown a few feet away. The hood is removed, the bird sees the lure, and pounces upon it. If he does not immediately attack the lure, he is hooded

[*Continued on page* 145]

Law!

LEARN AT HOME

Are you adult, alert, ambitious, willing to study? Investigate LAW! We guide you step by step—furnish all texts, including 14-volume Law Library. Training prepared by leading law professors and given by members of bar. Degree of LL. B. conferred. Low cost, easy terms. Send NOW for Free, 64-page "Law Training for Leadership."

LaSalle Extension University, Dept. 3493-L, Chicago

LEARN TO PLAY THE

HAWAIIAN GUITAR

the Hawaiian way. Surprise and entertain your friends. Amazing new simple method makes learning to play from REGULAR PIANO MUSIC as fascinating as a game. Shows you in pictures how to do it. Previous musical training and talent unnecessary. Learn while learning by new plan. You pay for the lessons just as they are received. Write today for free information. A postcard will do. (Fine guitars supplied $5 up.)

25c PER LESSON

ACADEMY OF HAWAIIAN MUSIC
6th Floor Lyon & Healy Bldg., Dept. 47C, Chicago

USED CORRESPONDENCE COURSES

AND EDUCATIONAL BOOKS OF ALL KINDS BOUGHT AND SOLD! NOW YOU HAVE A USED HOME STUDY COURSE YOU WISH TO SELL FOR CASH OR IF YOU WISH TO BUY ONE ON ANY SUBJECT, WRITE FOR FREE DETAILS TO:

HYMAN'S EDUCATIONAL SERVICE
Dept. F-5, Box 2187 Cleveland, Ohio

RAISE RABBITS FOR US

WE PAY YOU UP TO $5.00 EACH. ALSO PUT YOU IN TOUCH WITH MARKETS EVERYWHERE. Large illustrated book and catalog, also copy of the AMERICAN RABBIT FARMER and monthly market bulletin showing names of buyers in various parts of America who continuously buy all rabbits offered them. All for 10 cents. Address

OUTDOOR ENTERPRISE CO., 113 Main Street, NEW CITY, N. Y.

S-P-E-E-D!
AUTO RACING BOOK

Whole book brand new. Working drawings, pictures and full description of fast stock and race car chassis and bodies. Get dope on 100 m.p.h. stock V-8 Fords, 110 m.p.h. midgets, 120 m.p.h. Ford A and B conversions, 125 m.p.h. modified stock and 135 m.p.h. stock conversion speedway race cars. Order Today. Postpaid $1.00. C.O.D. $1.12.

RAY F. KUHN, Dept. A-3, Madisonville, Cincinnati, O.

FREE RADIO'S LEADING CATALOG

Send for the new 1935 ALLIED Catalog—a great book devoted exclusively to Radio. Over 100 pages packed with the latest Set-Building Kits—new Short Wave, All-Wave and Broadcast Models. Also the greatest line of Radio Parts and accessories ever listed—at unbeatable low prices. Send Coupon Now! Get the new World-Wide Radio Receivers, etc. Write for this valuable book. It's FREE. Address Dept. B-833 W. Jackson Blvd.

Allied Radio CORPORATION
833 W. JACKSON BLVD. CHICAGO, ILL.

WELD-BRAZE SOLDER WITH NEW ELECTRARK

ONLY.....

$7.50 PREPAID

COMPLETE With All EQUIPMENT

EASY TO OPERATE

Mechanics, experimenters, garages, home workshops, "Fixit" shops, battery men, all use Electrark Torches to weld, cut metals, braze, solder, and melt. Electrark operates from any 110-Volt A.C. or D.C. light socket. An actual operating cost of less than 5c per hour has been reported. Carry it right to the job, plug in, and operate at a minute's notice. The weight is small. Over-all dimensions only 4"x7"x8", with convenient carrying handle.

NO EXPERIENCE NECESSARY

A complete, illustrated instruction book makes operation simple on the most difficult jobs, and teaches you step by step to do excellent work. Merely plug the Electrark into any 110-V. light socket, put the arc into operation, and start actual welding. The current is small, automatically controlled to fit the work. It generates a pure, steady "flaming" hot arc that is easy to handle and will melt the toughest metals in a few seconds.

MANY USES

There are so many uses for Electrark that it is nearly impossible to list them all. A few jobs you can do for yourself . . . or for others at a profit are: Repairing cracked auto blocks and castings; Welding auto fenders and bodies; cutting out metal designs; burn holes in the hardest metals; weld and braze decorative iron furnishings; re-babbit worn bearings.

ALL EQUIPMENT—INSTRUCTIONS

All the supplies and equipment needed to operate the Electrark are included in every $7.50 outfit. With the supplies you can braze all metals, weld—cut metal, solder—not only for yourself but for others at a profit.

The Instruction book tells you how to do almost any difficult job that may come up. Included are: ⅛" carbon electrodes; tobin bronze for brazing; ⅛" carbon electrodes; Assorted mild steel filler rods; Goggles; Instruction book; Special "quick-way" Solder; and Welding flux. These supplies will last many hours of constant usage and can be replaced at low cost.

USER-AGENTS MAKE EASY EXTRA MONEY
Use Coupon For Sales Proposition.

USE COUPON
GET THIS ATTRACTIVE DEAL AT ONCE

EMPIRE ELECTRICAL PRODUCTS CO.
Box 285 I-2 Spokane, Washington

Gentlemen:
Please send me the items checked below:

I am enclosing money-order..... check..... for $7.50.
☐ Send me 1 Electrark Torch Outfit prepaid.
☐ Without obligation to me, send me details of your heavy-duty, master welder, price $25.00.
☐ Send me complete details of your User-Agent Sales Proposition.

NAME .....
ADDRESS .....
TOWN ..... STATE .....

NEW GEM
NOW $14.50

WITH 20,000-WORD BOOK

A Bausch & Lomb quality microscope—not a toy. Corrected lenses of true optical glass, ground and polished by ourselves—manufacturers of costliest scientific optical instruments. Shows marvelous details with scientific accuracy. Magnifies 75 to 172 diameters (lens for 300 diameters $2.50 extra). Walnut case and illustrated book included. Money-back guarantee. Ask your dealer.

Other Quality Equipment:—Model B, finest amateur microscope made, $21.00 (includes 455-Page Book); Photomicrographic Outfit, $12.00; 49-piece Science Kit, $9.50; Micro-Projector Set, $18.50.

DESCRIPTIVE LITERATURE FREE

Bausch & Lomb Optical Co., 115 Bausch St., Rochester, N. Y.

BAUSCH & LOMB

Be An ARTIST

Make $50 to $100 a Week

Learn at Home This Amazingly Simple Way

More and more trained Artists are needed each year. 28,531 magazines, advertisers, newspapers, printing houses, etc., pay good money for art work. Our simple, proven, personalized method makes it easy to learn Commercial Art, Cartooning and Designing quickly, AT HOME, in spare time.

Big Artists' Outfit Given

Drawing board, paints, brushes and all materials you need to learn and earn come with very first lessons. Actual fun learning to draw this new way. Be an artist and make big money!

Send for FREE BOOK

Our big Free Book describes latest developments and wonderful opportunities in this fascinating field and gives full details of this quick, easy method. Tells all about our students—their successes—what they say—actual reproductions of their work—and how many earned big money even while learning. Mail coupon below or postcard today. State age. (No salesman will call.)

$125 a Week!—that's what our graduate, Miss L. F. of Brighton, Ontario, is making selling war work in Montreal.

$3000 for W. R. K.—of Newark, N. J. He writes that just two contracts brought him that neat sum!

$3300 a Year—that's what W. S. A., graduate R. K. K., of Michigan, is drawing as Art Director of a big engraving house.

Free Book shows how

Washington School of Art, Studio 203
1115—15th St., N. W., Washington, D. C.

Please send me, without obligation, your Free Book, "Art for Pleasure and Profit."

Name.....Age.....

Address.....

City.....State.....

Slicing Microscope Sections

[*Continued from page* 61]

one that uses the entire cutting edge of the razor.

While a few materials, as plant stems or roots, may be cut fresh, most will be too soft for this treatment and will crush or tear. *Hardening* and *fixing* to prevent decay are essential. One of the best general fixers for plant tissues is Chrom-Acetic Acid, made by mixing 1 gram of Chromic Acid and 3 cc (cubic centimeters) of glacial acetic acid with 100 cc of water.

Place sections of plant stems, as cut, in a vial of this fixer for 48 hours, then *wash* in a very gentle stream of running water for 24 hours. Use a wide-mouth bottle fixed up as shown in the sketches, with a drop-by-drop stream of water.

After washing comes the process of *dehydration*, in which the water content of the material is gradually replaced by alcohol, which also accomplishes hardening. Transfer the sections to a vessel containing 50% alcohol for 10 minutes, then into 70% alcohol for a like stay, and finally into 82% alcohol where they may be left indefinitely.

Training Air Transport Pilots

[*Continued from page* 63]

Government inspectors now give rigid examinations in blind flying; if a pilot gets mixed up too much and becomes panicky, he gets no license—at least for a while.

The Secret of a Good Landing

Learning to land an airplane is easy if a student will remember one point which is seldom stressed or explained to student flyers, perhaps because it is not generally known. It is this: *The human eye begins to focus upon detail at a distance of about twenty feet.* If a student pilot, when approaching the ground for a landing, will note that moment when blades of grass, pebbles, sticks or anything on the ground suddenly loom up in *detail*, he will know it is time to level off for his landing. A lot of veteran aviators cannot tell how they know when to level off for a landing—they just do it.

Aviation Schools Teach Blind Flying

Despite the many things a regular transport pilot must know and be able to do, it is not at all impossible for a young man to learn to fly and reach this goal in two or three years.

A school for chief transport pilots already exists in the co-pilot job. The big air liners must have co-pilots who have also passed the transport license examination, but they are men usually of much less experience than the chief pilot. Co-pilots take over the controls occasionally, and help watch the instrument board.

425 Power - $18.50

Produced by Lens Specialists

Highest magnification you can buy at anywhere near this price. Fine optical quality, too—made by same experts who produce our world-famous movie and portrait lenses. Magnifications, 100 diameters to 425. Corrected for photomicrography. At dealers, $18.50. Or direct (check with order or C. O. D.) postpaid, under *money-back guarantee.*

OTHER MODELS

110 to 235-power model, - - $15.50
70 to 150-power model, - - $12.50
100-power model, - - $ 5.00
Home Slide-making Set, - - $ 3.50

WRITE FOR FREE CATALOG

WOLLENSAK OPTICAL CO., 821 Hudson Avenue, Rochester, N. Y.

INVENTORS
SEE PAGE 12

HELP Wanted

In INSTITUTIONS & HOSPITALS
● MALE & FEMALE ● INEXPERIENCED & EXPERIENCED

ALL KINDS of POSITIONS Practically Everywhere for NURSES, ATTENDANTS and OTHERS, with or without hospital experience. Many individuals associate a hospital only with Doctors, Nurses and professional people, never realizing that there are also hundreds of people employed with **NO PREVIOUS EXPERIENCE,** to perform many duties in various departments. All kinds of help constantly needed so why remain unemployed? Write **NOW** enclosing stamp to **SCHARF BUREAU, Dept. 3-72 145 W. 45th. New York**

FINANCE YOUR INVENTION

Plenty of Capital Available for Good Inventions or Business Ideas. We help you raise it. If you have a good idea or invention, patented or unpatented, and want to get it sold to the man stand, send $1 today for "A PROVED PLAN OF RAISING FROM ONE TO ONE HUNDRED THOUSAND DOLLARS.
MORRIS HITE, 612 Cotton Exch. Bldg., Oklahoma City, Okla.

AT LAST! A REAL POCKET RADIO

Can actually be carried in pocket or purse! No tubes—batteries—nothing to wear out. NO crystal to adjust. Simply clip to any metal object as in-laks, beds, telephones, etc. One control—gets all stations 50 to 100 miles; **Short wave & police calls also!** No complicated hookups or wires needed! Verified 1600-mile reception! Foolproof—and practical—great novelty. Can be used ANYWHERE while walking, riding, etc. Complete with tiny phone. Nothing else to buy. Send only $1.00 and pay postman $1.96 plus postage or send $2.99 (M.O., Currency, Check). Send $3.00 for any boy. Complete line., Included. Guaranteed. Catalog free.

TINYTONE RADIO CO. Dept. M Kearney, Nebr.

Earn Money with this WONDERFUL NEW INVENTION!

Real Money Maker for Part or Full Time AGENTS!

Make quick PROFITS with new, patented invention — sells on "flash" demonstration. Main or side-line. Big, new market.

Soldering Iron and Blow Torch IN ONE!

Light, portable. Eliminates pump, pressure system, stove, charcoal—ALL!

PROOF IT SELLS—Agent Howland earned $700 a month. — Ware sold 10 items while stopping in hotel! "Going like hot cakes," says Bailey.

WRITE quick—get established for EXCLUSIVE territory. A postal will do!

JUSTRITE MFG. CO., 2061 Southport, Dept. 23-93 Chicago

Genuine UNDERWOOD
Below ½ Mfg's. Original PRICE
(Refinished)

Famous Model No. 5

NOW Yours for 10 Days No Money Down—

Think of it—over 2 million buyers paid $102.50 (cash) for this model No. 5 now offered direct-to-you at way below ½ original price—and on easiest terms besides. Positively the greatest bargain ever offered. Accept the special 10-day trial offer and be convinced. See the neat, perfect work it does—compare its bright, shiny newness without risk. Recognized as the *finest, strongest* typewriter built.

Easy Terms—only 10c a day

Here is positively the chance of a lifetime to own a World-famous Standard Underwood No. 5 completely refinished at the very lowest price and easiest terms. All complete with modern improvements including standard 4-row keyboard, back-spacer, automatic ribbon reverse, shift lock, 2-color ribbon, etc. Ideal for business and professional men—teachers, students, story writers, etc. Don't let this chance pass by.

Learn Touch Typewriting.

Learn touch typewriting free! Complete (home study) course of famous Van Sant System given with this offer. Fully illustrated—easily learned.

MONEY-BACK GUARANTEE

You save over $60 by quick action. These genuine guaranteed Underwoods now only $39.90 (cash) while limited supply lasts. **Send an money!** The Underwood is yours for 10 days' trial. If you keep it—only 10c a day soon pays for your Underwood on our new low price and easiest terms. **Send at once before this special offer is withdrawn.** Remember every machine fully guaranteed and sent on 10 day trial.

International Typewriter Exchange
231 W. Monroe St., Chicago, Dept. 305

Send Underwood No. 5 (F. O. B. Chicago) at once for 10 days' trial. If I am not perfectly satisfied I can return it express collect. If I keep it I will pay $3.00 a month until I have paid $44.90 (term price) in full.

Name ..... Age .....

Address .....

Town ..... State .....

Reference .....

Raise Giant Frogs

A NEW, UNCROWDED INDUSTRY

Special breed "Nutond" Giants weigh up to 3 lbs. each.

BIG PROFITS!—NO COMPETITION!

MAKE BIG MONEY raising giant frogs. Breeder lays 10,000 eggs each year. Bullfrogs sell $1 to $3 per dozen. Biggest money-maker you can raise.

UNLIMITED MARKET WAITING

CANNED Frog Legs opens up a NEW, Giant Market. Wild frogs almost gone. Demand exceeds supply. Be a frog raiser.

START BACK YARD—ANY CLIMATE

Small pond starts big business. No experience necessary. No equipment except fence.

Get the facts on this new industry. Our big FREE book explains everything.

SEND FOR **FREE BOOK**

AMERICAN FROG CANNING CO.
119-C New Orleans, La.
Originators of CANNED Frog Legs
LARGEST FROG MARKET IN THE WORLD

GET YOUR 1935 HOW TO BUILD IT NOW—50 Cents

WANTED ··· BRANCH ··· MANUFACTURERS

On small or large scale for our NEW LINE of Cast Metal 5 and 10c Novelties, Toy Automobiles, Ashtrays and other all year sellers. No special place or experience necessary as we furnish full instructions with moulds and cooperate in selling, also buy finished goods. Chance of a lifetime for man with small capital to get into this new and profitable industry. If you mean strictly business and are over 21, write AT ONCE for details as we are now closing arrangements for 1935 business.

METAL CAST PRODUCTS CO.
1936 Boston Road Dept. 2 New York, N. Y.

Home Manufacturing Enterprises

shows you how to make all kinds of useful novelties of wood, tin, plastics, leather, reed. List of contents—Section 1. Novelties of leather. 2. Useful items from cans. 3. Typewriter ribbons. 4. Novelties from wood. 5. Plastic molds. 6. Lawn furniture. 7. Novel baskets. 8. Reed work. Price 25c pp, with six months subscription to Home Industries free.

HOME INDUSTRIES
Box 89 Irvington, Nebr.

Controlling—Power and Transportation

Diesel engines—because of their high efficiency, dependability and economy of operation—are fast replacing steam and gasoline engines in power plants, motor trucks and buses, locomotives and ships, tractors, dredges, drills, pumps, etc.—opening up steady, well-paid jobs for Diesel-trained men.

You can get the necessary training at home on all the latest Diesel developments—two- and four-stroke cycles; mild- and air-injection fuel systems; low- and high-speed and heavy duty types; Diesel-electric generating system, etc. Course includes all text material—with special diagrams making possible quick understanding of this new type of power.

Diesel Engineering offers you a chance to get into a field that is on the upgrade and continually expanding — one that will require more and more Diesel-trained men for the next 25 years, or as long as you need to work. A very important part of our service is that, when the student has completed his training, we help him search out an opening in the Diesel Engineering field where he can be sure of steady advancement, with an ever-increasing reward for his foresightedness in getting training. Write today for free Bulletin. No obligation.

American School, Department D-328, Drexel Avenue at 58th Street, Chicago

A Gold Fortune from Four Dollars

[*Continued from page 49*]

the hills who have had the key to riches in their hands and have not recognized it.

"We all had jobs in mines around here," said Parfet. "That staked us to food, shelter and clothing. We'd work days for wages and on Sundays, holidays and summer evenings, we prowled the hills looking for our mine."

Then one Sunday a sample panned rich. The vein was on private property. One that people said had been "worked out." They knew the moment they looked at the pan that here was a find; a new vein nobody else had found—at a spot where thousands upon thousands of miners had passed in years past.

Start Operations on Small Capital

He told how the four kept their heads, and their jobs, after they had struck this find. They worked eight hours for wages, got supper, then went up to the lease and while afterglow lit summer evenings, they put in another day's work on their mine.

Every stick, bolt and bearing of that outfit has been assembled out of salvaged, donated or reclaimed equipment except the sprocket and shaft for which Parfet paid $4.25.

The two giant timbers of the scaffold and all the rigging on it are salvaged junk.

Let us look inside the cabin on the hill. A very ancient Dodge motor car makes the power plant. It has been cut off about four feet back of the cowl, the gas tank is on the right fender, decking has been built where footboards had been, the front seat has been removed, and the operator sits in a barrel chair facing what has been the left hand side of the car. In front of him, parallel to the car, is the cable drum assembly.

Runs Blower for Forge

As though this were not enough, they put a wooden pulley on the shaft between the engine and the first sprocket, a belt runs from this, and turns the blower for the forge which is on scaffolding above the engine level. Between the blower and the pipe that delivers the air into the side of the forge is a section of automobile tire inner tubing. It is the "expansion" joint. The forge is a section of old smokestack, cut off, set on the ground, filled with dirt and fire cement to close to the top. The air line, fitted with a valve, enters the side of the old smokestack, and turns to come up in the center of the fire cement bowl.

If you searched out every "strike" in the hills you would find a story something like this back of it; but with each confirmatory case you would get new, emphatic evidence that the right kind of men, who will stick, stand a chance of making just as good as those old timers did in early days.

For MORE PAY Learn

DRAFTING

FROM AN ENGINEER

Learn by mail at home

Prosperity is coming. Be prepare for a bigger, better job Get the training now.

These TOOLS and Other EQUIPMENT Given When You Start

"I will train you by mail," Engineer Dobe

WRITE for valuable book, "Success in Draftsmanship"—free. *See coupon below.*

I'LL TRAIN a number of *selected* students as practical Draftsmen. Yes, I furnish you all tools and a drawing table. And I'll teach you in a surprisingly short time by mail in your spare time until you actually have a desirable draftsman's job so that you are fully satisfied.

Trained men needed now; jobs pay $50 a week or more; *be prepared!*

Keep the job you have now while training. I'll tell you how to start earning extra money a few weeks after beginning my training. Get started now. *Send coupon.*

Jobs Open NOW!

After training you I help you to a job without charging you a cent for this service. For 30 years employers of Draftsmen have been writing me when they want help.

Aviation
Electricity
Machinery
Auto Work
Building Work

All these industries and others, too, must have draftsmen in their offices. These industries are now growing fast; *be prepared.* You do not need a high school education to learn by the Dobe method. No previous experience necessary. But you must have willingness and a record of honesty.

Money Back if Not Satisfied

You must be entirely satisfied with my personal training UNTIL COMPETENT and UNTIL assisted to a position OR (notice this!) you get ALL YOUR MONEY BACK.

START NOW and get the *training.* Then YOU will be the one who is *ready* for that bigger, better job. So, send the coupon NOW.

FREE BOOK

ENGINEER DOBE, Div. 47-33 Libertyville, Ill.

Send me your free book "Successful Draftsmanship" and please explain how you will assist me to a good position as a draftsman.

Name..... *Age*.....

Address.....

.....

Classified Advertisements

Rate for classified ads. 15c per word (include name, address and all numbers) per insertion. (New rate effective with April, 1933, issue.) Minimum 10 words. Cash must accompany order and be received in this office February 5 for the April issue (on sale March 30). Address Classified Mgr., Modern Mechanix and Inventions, 1501 Broadway, New York City.

A. C. GENERATOR

TWENTY new practical changes for automobile generators. See our advertisement at bottom of page 32. Auto Power, Inc.

ADVERTISING AGENCIES

ADVERTISE.—$15 reaches 6,000,000 readers with 24 word add. in newspaper and mail-order magazine. Rate-Guide, free. Chicago Advertising Agency, 22 West Jackson, Chicago.

ADVERTISE—24 words in 250 newspapers $10. Lists Free. Advertising Service Bureau, 4650 Drexel, Chicago.

FREE NEW advertisers rate guide. Brown Advertising Agency, 140 South Dearborn, Chicago.

AGENTS WANTED

$200 to $800 monthly in small territorial business. Large profits for you making mushroom spawn at home. Thousands use it. Patented. Only equipment needed—typewriter. No canvassing, all mail order at home. 5c investment brings $2.50. Enclose 5c, coin, for descriptive folder, bank statements, etc. NORTH AMERICAN SPAWN COMPANY, Ontario Building, Toronto 2, Canada.

BIG MONEY and Fast Sales. Every owner buys Gold Initials for his auto. You charge $1.50; make $1.45. Ten orders daily easy. Write for free samples and full particulars. American Monogram Company, Dept. 11, East Orange, New Jersey.

AGENTS: Sell Smash go prices. Santos Coffee 12c lb. 4-oz. Vanilla 8½c. $1.00 size Tonic 14c. Razor Blades 10 for 8½c. 100 sticks Chewing Gum 12c. 150 other bargains. Experience unnecessary. Write Carnation Co., MN, St. Louis, Missouri.

MAKE MORE MONEY Taking Orders Shirts, Ties, Underwear, Dresses, Hosiery, Raincoats, Coveralls, Pants, Uniforms, Sport Coats. FREE! NIMROD COMPANY, Department 132, 4922-28 Lincoln Avenue, Chicago.

START bargain store business. Tremendous profits. New and used clothing. Bankrupt auction sale merchandise. Experience unnecessary. Everything supplied. Publix, 568-GC Roosevelt, Chicago.

SELL Colored Folks: Hair Straightener, Bleach Cream, Perfumes, Incense, 200 Products. Write for Free Samples. Big Money Making Offer. Valmor, 5249-SM Cottage Grove, Chicago.

MAKE MONEY. Collect $5, keep $4. Two quick selling dollar per month "hard times" life policies. Great Northern Estate Corporation, Department C, Rockford, Illinois.

FENNY Each. Popular Sizes. Guaranteed Window Sign Letters. Enormous Profits. Easily Applied. Free Samples. Atlas Sign Works, 7941-G, Halsted, Chicago.

BIG MONEY applying gold initials on automobiles. Easiest thing today. No experience needed. Free samples. "Ralco," 1084 Washington, Boston, Mass.

GOOD Income Plating Auto Parts, Reflectors, mirrors, by new method. Outfits furnished; free particulars. Gunmetal Co., Ave. A, Decatur, III.

OPPORTUNITIES Galore—Write for particulars. Over 400 Money Making Ideas, Plans, etc. A. Wolfe, 2085 Valentine, New York City.

CASH Income Resilvering Mirrors; Replating Metalware; Making Glass Signs. Portable Outfit. Sprinkle, Plater, 850, Marion, Indiana.

REGULAR income, home, office, no canvassing, prospectus free. Niel's Specialty Sales, Box 6, East Rockaway, New York.

AGENTS: Gold Sign Letters for store windows. 500% profit. Free sample. Metallic Letter Co., 426 N. Clark, Chicago.

FIREFUSE Prevents Fire. Costs 25c. Sells for $1.00. Sample 35c. Goldenrule, 2018 March, Kalamazoo, Mich.

DIME Brings "Key To Greater Earnings." Personal Service, 1744-M Clay, New York.

900,000 Articles wholesale. Directory 1,500 jobbers $1.00. 300—25c. ARTS, B-1611 N. Racine, Chicago.

FREE literature describing many money-making plans. D-Belfort, 4042 N. Keeler, Chicago.

SELL 1000 Illustrated Cards, $1.75. Third Commission. Brigshaw, 3214 Huron, Chicago.

REGULAR income; home, office. No canvassing. McArthur Co., Desk 19, Butte, Montana.

PARING Knife. Sample 25c. J. H. Ferguson, 1202 Carlisle Ave., Dayton, Ohio.

AIRPLANES

HUNDREDS of Planes. Crackups. Dirt Cheap. Directory 20c. Used Aircraft Directory, Athens, Ohio.

AUTO TRAILERS

BOOK of Camp trailer plans containing fifteen modern designs ranging from 8 to 16 feet. Copy sent postpaid for $1.00. Supply list 10c. Toellen Coach Co., Box 25, College Park Sta., Detroit, Mich.

AUTOMOTIVE ACCESSORIES

INCREASE mileage, horsepower, speed, acceleration. Send $2 for guaranteed device. Give make and model. Carburetion Engineering Company, 5719 Loraine, Detroit.

AVIATION

METAL tipped propellers; Fords, $9.98; Henderson, $8.50; Harley, untipped, $3.50; New production ships, $98.00; Improved LeRhone 40 H.P. motors, $137.00. Photos, information, and leather bound flying manual, 25c. Hibbs, Fort Worth, Texas.

GET into Aviation. Air transport pilots get up to $7,000 per year; mechanics, $2,500. Learn at this government approved school. Write for complete information. State age. Lincoln Flying School, 4001 Aircraft Building, Lincoln, Nebr.

ARMY Air Corps gives free flying training, salary, expenses paid. Information booklet, how to qualify, 2nd, 20c. Same information on Navy Aviation, 20c. Continental, Box 344A, Indianapolis, Ind.

MODEL Airplane Blueprints of War Planes, Endurance Models, etc. Complete blueprints at bargain prices. List, 3c stamp. Midget Aircrafts, 1803 Liliha Street, Honolulu, T. H.

LORENZEN Propellers for Airplanes, Ice, and Snowsleds, and Wind Driven generators. Large illustrated catalog, dime. Lorenzen Propeller Company, Niles, Michigan.

AIRMINDED young men interested in entering aviation as apprentices. Write immediately, enclosing stamp. Mechanic's Universal Aviation Service, A-13291 Ardmore, Detroit, Mich.

DON'T Buy anything until you get Ort's Aviation Material Catalogue. Prices are lower. Send one dime today. Karl Ort, 3417 W. Potter, York, Pa.

USED Airplanes, Gliders, $30.00 and up. Literature 10c. Continental Sales, Box 344A, Indianapolis, Ind.

BATTERIES

BUILD New Batteries from old, work at home. Daily cash demand. Thousands can be put into service. Send 25c for formula, instructions, mold catalog. Home Occupations, St. Paul, Minn.

PROFIT rebuilding batteries. Make your own plates. Information 25c (coin). Gen. Batt. Service, 78F Glenwood, Minneapolis Minn.

BIG MAILS

BUSHELS of letters bringing money-making opportunities, 25c. Mailmarts, Cincinnati, Ohio.

BLUEPRINTS

AUTO RADIO blueprints, with plans for 6 tube set and vibrator type B battery eliminator, sent postpaid for 50c. Other radio blueprint bargains listed in new M-M blueprint book, sent free for stamped, addressed envelope. Modern Mechanix Pub. Co., 529 So. 7th St., Minneapolis, Minn.

DRILL PRESS 75, ARBOR PRESS —35, GRINDER 60; Blueprints, instructions. Easily made. Low cost. No machining. Common materials. Rugged, accurate. Engineering Supply, Vista, Illinois.

BOATS

LATEST BOAT SENSATION! 20th. Mead "Ki-Yak" . . . snappiest thing afloat. Assemble it easily from complete factory parts, best low priced canoe. Free—$6 Paddle given with first Ki Yak purchased in your town—hurry! Rush 10c for Catalog. MEAD GLIDERS, 15 South Market, Dept. M.C.-3, Chicago.

BUILD a kayak. Complete kit, cut-to-fit, $6.95 up. See last page, this issue. Mail dime for literature or quarter for instructions. Refunded with order. Boat Shop, Box 737, Greenville, Pa.

BOOKS

BOOKS Useful to Everyone: 1. Hints on Public Speaking. 2. Secret of Self Development. 3. How to Write Business Letters. 4. Lessons in Vocabulary. 5. Effective English in Speech and Writing. 6. How to Overcome Self-Consciousness. 7. Dictionary of Musical Terms. Group for only $1.00; 3 for 50c; 20c each. Millard Distributing Co., Dept. 13, Box 2621, Minneapolis, Minn.

MULTIPLY or Divide any sized numbers easily with The Math Pony. Dictionary of Numbers. For Business, School, Home. 1000 Products. 212 Pages. $1. Box 1810-M, Milwaukee.

BOOKS, Books, Books. If you are looking for scientific or technical books, send 10c in silver for my book catalogue today. Levi Bryant, 654 East 44th St. Chicago, Ill.

BOOKS—Everything; Reference Sets; List 5c. Mitchell's, 10407 Lexington, Kansas City, Mo.

SEND stamped, addressed envelope for free copy of big M-M Blueprint book, listing many workshop books and blueprint plans. Modern Mechanix Publ. Co. 529 So. 7th St., Minneapolis, Minn.

FICTION and Book Lovers, send for particulars of special bargain offer. Sisser Lloyd, 745 South Elizabeth, Lima, Ohio.

BOXING

LEARN Boxing—Complete illustrated instructions 25c. Wrestling 25c. Jiu-Jitsu 25c. Muscle Building instructions and exercisers $1. Prof. Dryer, Box 1810, Chicago.

BUSINESS OPPORTUNITIES

THE PLASTEX Industry needs manufacturers on small scale and for big production of Art Goods, Novelties, Souvenirs, etc. in Plastex. Very simple, Inexpensive, Lucrative. Experience unnecessary. 2c mail makes 25c articles. Rubber moulds furnished for special production. We place orders and buy goods. Small investment brings big returns. Interesting booklet mailed free. Plastex Industries, Dept. R, 1085 Washington Ave., New York.

LEARN flexible mold making using our Rubber Composition. Inexpensive, durable. Fine for novelty manufacturing. Casts made of Liquid Marble resembles real marble. Glossy finishlike hardness. Great for novelties, statues. Enamel concrete products. Make table tops, floors, etc. All branches marbleizing and mold making taught. Dime brings miniature mold, assorted marbleized samples. Cowell Institute, Grayling, Mich.

DO YOU want to make real money with a minimum amount of work without having to gamble, make a heavy investment or take part in any contest or competition? Particulars sent free to anyone upon receipt of self addressed stamped envelope. The Pyramid Prosperity Plan, 4741 Wabash Avenue, Detroit, Michigan.

"EVERY Man dreams of having a comfortable income. Why be content with a bare living when it is so easy to be independent? Our valuable booklet 'Opportunities' describes many money makers and can be had for only 25c. Don't delay. The National Book Agency, 4837 N. Albany, Chicago."

SURE MONEY. 100 fine show cards per day better than artist can do them—with new multi-color spray and cut out letter process. Pays for itself on one day. Literature describing complete process free. Samples of work 10c. New Way Co., Box 226, Berkeley, California.

FREE Circulars describing thousands of money making plans. How you can make thousands of dollars yearly in a Mail Order Business, starting with a few dollars at home in spare time. Write to Mail Order Institute, 669-L Marcy Ave., Brooklyn, N. Y.

COMPLETE Chemical Service, Analysis, Formulas, Consultations. Licensed Chemist. Twenty-five years' experience. Write for literature. W. L. Cummings, Ph.D., 428 Gordon Avenue, Syracuse, N. Y.

HOMEWORKERS—$25.00 weekly for eight hours' work addressing envelopes. Everything furnished. Capital or experience unnecessary. Complete instructions 25c. Business Builders, Jamesburg, N. J.

PAYDAY every day! New invention starts big money mail order business. Simple homemade device assures profits. Pleasant easy work. Information FREE. Robert Swanton, DeLand, Florida.

GOOD Brick Butter (not butterine) 6c lb. Particulars 25c coin. Results guaranteed or money refunded. Hallock Co., 6219C Wentworth, Chicago.

EARN while learning—men—women—your own Cleaning—Pressing Business. Easy home training. Free Outfit offer. Write C-52 Business Ownership Institutes, 2400 W. Madison, Chicago.

MAIL Scheme! Year to set-up! Averaged $120 day! Sworn Facts! Complete Copies of exact literature used in obtaining above amount, $3.00. Simplex, Box 562-L, St. Louis, Mo.

EARN MONEY. Steady incomes. Big 60-page magazine full money-making plans, opportunities, ideas, information. $1 year. Trial, 3 months, 15c. Ward M. Smith, Fergus Falls, Minn.

FREE BOOKLET describes over 100 money-making opportunities for starting own business. Home, Selected Publications, 501E, Alamo National Bldg., San Antonio, Texas.

FLASH-AD! New! Dynamic! Manager $100 weekly. No Investment. No Selling. Layouts, Territory Assignment, $1 with application. Box 2621, Tulsa, Oklahoma.

OPERATE Chain of vending and amusement machines. Be independent for life. Start small, grow big. M. Goodbody, 1826 East Main St., Rochester, N. Y.

OPEN a key-making shop. Start a permanent, profitable business with a small sum. No selling necessary. Write for particulars. Beisser Mfg. Co., 419 E. Fort, Detroit, Mich.

HOW would you like to receive 100 letters a day, each containing a dime? Will send Plan for 10c. C. L. Cleeland, 1Cleeland Building, Butler, Pennsylvania.

CASH: Listing Local Names. Interesting spare time home occupation. Complete working plans 25c postpaid. Publishers Bureau, 850 East 47th, Chicago.

SIGNS and Showcards Easily painted with Letter Patterns. Large variety of styles and sizes. Write for free samples. John Rahn, B-2120 Nova, Chicago.

HOW would you like to receive 100 letters a day, each containing a dime? Will send plan for 10c. Carl Greiner, 5112 N. Oakley Ave., Chicago, Ill.

PRINT YOUR OWN Circulars, Envelopes, with home made press. Costing about $1.00. Illustrated Instructions 10c. Hale, 1122 Adams, Chicago.

FASCINATING, Profitable, Easy—Make tunnels, fountains, etc. from bottles. Illustrated instructions 25c. Henry Estberg, Waupaca, Wis.

A FORTUNE Awaits You! New formulas for every business at home in spare time. Particulars Free. Hetzel, 802 Garden, Hartford, Conn.

SUCCEED With Your Products. Make-sell them. Formulas, Processes. Analytical Service. Catalog free. A. Thaxby Co., Washington, D. C.

RECEIVE 100 Quarter daily through mail. Three dollar plan, quarter, coin. James Lester, 312 E. Susquehanna St., Allentown, Pa.

COPIES of 5 Successful Mail Order Sales Letters, $5. Business Letter Institute, DD-203 South Dearborn, Chicago.

FREE literature describing plans, formulas, ideas for a business of your own. ADVISOR, 2432 North Mc-Vicker, Chicago.

CASH Income Resilvering Mirrors; Remitting Machine; Making Glass Signs. Portable Outfit. Sprinkle, Plater, 845, Marion, Indiana.

GREATER earnings! Home, office. Particulars Free. Hochman Service, 269 West First, Mount Vernon, N. Y.

INVENTION and Finance Magazinette; sample copy sent upon request. 5 Beekman Street, Dept. H, New York.

PART time money maker. Plan complete with prospects 25c. Hurry offer limited. Enterprises, Box 735, Sta. C, Los Angeles, Cal.

MEN handy with brush may earn five to ten dollars per day with my plan and instructions, 25c coin. Eben Bearce, Scituate, Mass.

STEADY, Part time. Household necessity. Big money-maker. Everyday needs. No bunk. Facts for dime. H. T. Sales, Olney, Ill.

COPIES of 5 Successful Jobwinning Application Letters, 25c. Business Letter Institute, CC-203 South Dearborn, Chicago.

MAKE garage doors automatic. Do work yourself. Cost two dollars. Plans forty cents. Cliff Sherwin, Cannon Falls, Minnesota.

GET PAID $5 OF MAIL. Your name in 10,000 Opportunity Directories, 25c. Roservice, 4627 Glenahade, Cincinnati.

AMATEUR cartoonists, earn $25.00 week, spare time, copying cartoons for advertisers. Three-M Syndicate, Argyle, Wis.

SELL, by Mail! Books, Novelties! Bargains! Big profits! Particulars Free! H. Elfeo, 525 South Dearborn, Chicago.

MONEY, Making New Streamline Lawn Nets. Pattern and Instructions $1.00. Earl Callender, Milburn, Ky.

NEW plan brings dimes every mail. Nothing to sell. Information 10c. Stepanco, 119 Hull Des Moines, Iowa.

PROFITABLE Ideas. Make more money. Particulars free. Peoples Institute, 1942 Sunnyside St., Chicago, Ill.

NEATEST Home Business guide. Complete instructions 15c coin. Advance Service, Box 306, Midland, Michigan.

SUCCESS—"Key to Greater Earnings"—Book now. 10c coin, refundable. Roberts, Box 121-B, Oakland, Calif.

DAILY Income for men or women, work home or office. Details 10c. Write Geo. Rose 899, Los Angeles, Calif.

YOUR mail worth $10.00 daily. Detailed instructions 10 cents. Pettit, 1379 Teller Ave., New York City.

MAKE $5 automobile anti-freeze, easily, cheaply. Complete instructions, 25c. Westcott, Clyde, N. Y.

PARTNER WANTED. Help Operate, Profitable Chocolate Business. Details. Duffy-Co., Covington, Ky.

MONEY-MAKING information: new, practical, profitable, worthwhile. Hawkeye Remedy Center, Iowa.

STEADY Income from drained auto oil! Instructions, 25c. International Agency, Cincinnati, Ohio.

TATTOOING Outfits, Supplies—Catalogue. Guaranteed Remover. "Waters," M-965 Putnam, Detroit.

HOME WORKERS — ninety cents profit each dollar order, details free. Box 10, Norwood, O.

TURN old school books into money! Instructions 25c. National Textbook Co., Salisbury, N. C.

YOU too, can make a good living operating an Amidon Exchange. Hugh Amidon, Elvria, Ohio.

CASH returns positively guaranteed! No canvassing. Rush dime. Mailmarts, Cincinnati, Ohio.

RECEIVE 100 Dimes Day. No Selling. Proven Plan. Promoter, Homewood, California.

MAKE mirrors from old window glass. Complete instructions, 25c. Westcott, Clyde, N. Y.

SELLING FORMULAS. New dollar Mailorder Plan, 25c. Duffy-Co., Covington, Ky.

WISE Men Get Money Easy! Plan 10c. "Mooremade," Lapeer, Mich.

MEN-WOMEN interested earn money home, write Eller, F-277 Broadway, New York.

WHOLESALE Supply Sources, half million items, 10c. International Agency, Cincinnati.

NEWSPAPER Clippings Pay. Information 25c. Goodall, Box 1592-P, San Francisco.

"SELL Neat Letterheads. 1000—$1.99. $5 Hour. DODDS-V, Cedar Rapids, Iowa."

WASTE Oil Burners $1.00. Plan 20c. Progress, 747 American, Long Beach, Cal.

WHOLESALE Supply Sources, half million items, 10c International Agency, Cincinnati.

$35 $40,000—I made it. Plan 10c. "MooreMade." Lapeer, Mich.

BUSINESS SERVICE

YOUR business made successful. We write your letter, ad, advise for $1.00. Advertisers Service, Box 733, Sta. C, Los Angeles, Cal.

COPIES of 5 Successful Mail Order Sales Letters, 50c. Business Letter Institute, BB-203 South Dearborn, Chicago.

SALES, collection and appeal letters effectively written, $10 each. Lucian Chappell, Box 323M, Chicago.

FORM letters, multigraphing. 1000 Letterheads or envelopes printed $2.95. Ace Letter Shop, Moline, Ill.

CAMERAS AND PHOTO SUPPLIES

INCOME From your camera instead of expense. Low cost home course teaches you to make photographs for magazines, newspapers advertisers. Tremendous demand. Earn good money wherever you live. Free book. Universal Photographers, Dept. A, 10 West 33rd St., New York.

FREE! Bargain Catalog—Greatest Inventory Clearance Sale in our 35 years. Send us your photo copy listing thousands of cameras, lenses, accessories and photographic supplies. Central Camera Co., Dept. MME-31, 230 South Wabash, Chicago, USA.

MAKE Money in Photography. Learn quickly at home. Spare or full time. Nothing like it. Experience unnecessary. American School of Photography, Dept. 2046, 3601 Michigan Avenue, Chicago.

ALL-PURPOSE Camera, enlarger, and photo-taking equipment plans are in 1935 How-To-Build-It, 146-page book of home and workshop projects. Price 50c. Modern Mechanix Publ. Co., 529 S. 7th St., Minneapolis, Minn.

KODAKS at Cut Prices, Catalogue Free. Kodak Shop, Sac City, Iowa.

CARNIVAL GAMES

MAKE you money—Outfits supplied, catalog 10c. "Mooremade", Lapeer, Michigan.

CARTOONING

DRAWING and painting instruction book for advanced Students. 100 illustrations, 110 pages. 30c postpaid. Lawrence Publishing Co., 143-B West 100th St., New York.

CARTOONING COURSE: 30 Lessons, 500 Illustrations, with drawing pens and pencils. $1.00 Postpaid. Sowell Studios, Box 610-M, Hollywood, Calif.

WHERE To Sell Cartoons, 25c. Cartoon Market Guide, 3235P Jefferson, Cincinnati, Ohio.

CHALK TALKS

LAUGH Producing Program, $1.00. Catalog free. Balda Art Service, Dept. 65, Oshkosh, Wis.

COMICS For chalk talks $1.00. Sanden, 716 21st, Bellingham, Wash.

CHEMISTRY

FASCINATING Chemistry Magazine contains loads of Experiments, News, Problems, Queries, Jokes. 5 cent stamp brings sample. Chicago Press, 162A, W. Carroll Ave., Chicago.

CHEMISTRY Magazine (Illustrated). 3 months 25c. 1015 High, Petersburg, Virginia.

DETECTIVES

DETECTIVES. Make Secret Investigations. Experience unnecessary. DETECTIVE Particulars free. Write, George Wagner, 2640-V Broadway, N. Y.

BECOME a successful detective. Particulars and Detective Paper Free. National System, 340-D Electric Bldg., Omaha, Nebraska.

BE A Detective. Make secret investigations. Experience unnecessary. Write United Detective System, 1623 W. Grand, Chicago.

DETECTIVES. Work home or travel. Experience unnecessary. Write, American Detective Institute, 2640-T Broadway, N. Y.

DISTRICUTORS WANTED

DISTRIBUTORS: Represent manufacturer. Sell LATEX—self sealing Bandage that breathes. Great demonstrator. Lowest prices. 400% profit. Good repeater. Exclusive territory. NEWAY, 24-G South Clinton, Chicago.

DOG TRAINING

TRAIN Your Dog for Vaudeville or Home Amusement, 80 interesting tricks also lessons in obedience, guarding, etc. $1.50. Sowell Publishers, Box 610, Hollywood, Calif.

DUPLICATORS

INCREASE Business. "Excellograph" Rotary Stencil, Ink Film Duplicators $3.85 to $37.50. Prints anything typewritten, penned, drawn, traced. Colors. Free Book. Pittsburgh Typewriter Supply, Suite 519, Pittsburgh, Pa.

EDUCATIONAL

USED Correspondence Courses and Educational Books sold or rented. Inexpensive. Money back guarantee. Write (Free Catalog) Lists 4000 bargains. (Courses Bought). Lee Mountain, Pisgah, Alabama.

ELECTRICAL EXPERIMENTS

BANKRUPT Stock—Electrical Experimental kits—Kit makes motors, detectophones, arc furnace, telephones, etc. Salvage price $1.99. Other outstanding electrical bargains. Catalog — Sherman Electrical Salvage Co., Box 524-D, Lincoln, Nebr.

INSULATION. Wire, varnishes, supplies, etc. Send 3c stamp for bulletin. Auto Power, 412 S. Hoyne Ave., Chicago.

EMPLOYMENT SERVICE

DO YOU Want a Salaried Job? The Jobseeker's Guide shows how! Securing the right position depends mostly on knowing how to proceed. Good salaried positions always open to ambitious applicants who know the secret of presenting the real value of their service. No matter where you live, or what type of work you like to do, the "Jobseeker's Guide" can help you find the position you want. Price $1.00 postpaid. 5 successful, model application letters and "Qualification Analysis" Free. Rush name and address with $1.00 today. Employment Counselors, AA-702 East 63rd, Chicago.

FARM LANDS

FREE homesteads, some improved, forfeited; 18 states. Many "700 Facts," 40c. Box MY31, Modern Mechanix, 1501 Broadway, New York City.

FARM LIGHT PLANTS

CONVERT Maytag washing machine motors into light plants with our special mounting base, using S. H. Dodge generators. Lights complete home $50.00 including batteries. Eliminates kerosene lamps. Send 25c for illustrated course and instructions. Home Occupations, St. Paul, Minn.

FIRE ARMS

GUNSMITH'S Secrets—Bluing, checkering, engraving, etc., 25c. International Agency, Cincinnati.

FLY & LEADER MAKING

FLY and leader makers tools and materials. Complete line. List FREE. Paul H. Young, 8065-4 Grand River, Detroit, Mich.

FOR INVENTORS

INVENTORS: Send immediately for your copy of our big, new Free book, "Patent Protection." Forty-eight pages of interesting facts. Tells how Patent Laws protect you; kind of sketch or model needed; simple steps to take without cost; how successful inventors have secured financial assistance; shows interesting inventions; illustrates important mechanical movements. Tells how to have real and profited by this book. With book we also send Free Evidence of Invention Blank you can use to establish date of disclosure. Prompt service, reasonable fees, special deferred payment plan. Strictest secrecy. Thirty-six years' experience. Highest references. Write us today. The facts in our book are worth money to you. Don't wait a good invention. Address: Victor J. Evans & Co., Registered Patent Attorneys, 645 Victor Building, Washington, D. C.

PATENTS—Before too heavy an outlay of time or money is made on an invention, a search of the Patent Office records should be made to determine as nearly as possible whether or not the same idea has been patented before. The cost of this search is small, while the value of the facts it uncovers is often considerable. We offer inventors and manufacturers a thorough prompt, confidential research service—plus experienced counsel and assistance in every phase of Patent and Trademark practice. Write for my new free book containing valuable information regarding the patent procedure. Clarence A. O'Brien, Registered Patent Attorney, 28-R Adams Building, Washington, D. C.

INVENTIONS—how they work. Our interesting collection of patent cases fully illustrates and explains. Shows how problems of many inventors were solved—outstanding ideas that broaden conception. Fascinating and inexpensive. New page copies weekly. Send stamp for details. Patent Copy Service, P. O. Box 249, Ephrata, Penna.

INVENTIONS now salable before patenting. Send for free information, write Chartered Institute, 598 Barrister Building, Washington, D. C.

INVENTORS—Sell your inventions before patenting. Free particulars. Write W. T. Greene, 942 Barrister Building, Washington, D. C.

FORMULAS

8,000 Famous formulas $3.00. 4,000 $2.00. 2,000 $1.00. 500—25c. 30 Automobile 25c. ARTS, B-1611-X, Chicago.

700 SECRET trade formulas, manufacturing processes and money-making plans. 30c postpaid. Lawrence Publishing Co., 143-B West 100th St., New York.

SUCCEED With Your Products. Make-Sell them. Formulas, Processes. Analytical Service. Catalog Free. A. Thaxby Co., Washington, D. C.

HOME Necessity. We Guarantee Formula and Repeat Sales, 25c. Winx, 10 E. Main, Carnegie, Pa.

"MANY Money Making plans and formulas 25c. National Book Agency, 4837 N. Albany, Chicago.

AMAZING Auto Anti-freeze formula 25c. Catalog. Allied Research, 2217 N. Kilbourn, Chicago.

COMMERCIAL Formulas 25c. Associated Chemists, 501 Surf Avenue, Brooklyn, New York.

525 PRACTICAL Formulas 25c. Profitable Literature free. Pelishek's, Adell, Wisconsin.

TWENTY leading formulas! Quarter brings them all! International Agency, Cincinnati, O.

ANY Formula or Process 25c. Louis Jochmans, 614 E. Jefferson, Syracuse, New York.

FORMULAS—All kinds. Guaranteed. Catalog Free. Kemico, B-16, Parkridge, Illinois.

ANY formula 25 cents, graduate chemist. Lexico Co., 835 Lexington, Cincinnati.

ANY formula 25c another free. Finnegan, 89 Wachusett, Jamaica Plain, Mass.

24 TESTED Formulas, 50c. Hochman Service, 269 West First, Mount Vernon, N. Y.

DRUG Product Formulas! New Lists 10c. Continental, 3542 Polk, Chicago.

FORMULAS—Interesting Literature Free. D-Belfort, 4042 N. Keeler, Chicago.

TEN Profitable Formulas one dime. Wm. Snow, Webster, N. Y.

FINGER PRINT OUTFITS

FINGER Print Outfit $1; in Wooden Case $2. American System, 219-F West 10th St., N. Y.

FISHING SUPPLIES

MAKE Dipsies for use or profit. Free folder. Reading Instrument Co., Reading, Pa.

GUMMED LABELS

1000 GUMMED Address Labels, 50c. Marsh, 8125 N. Cayuga, Ithaca, N. Y.

HEATING

"MORE heat—less coal. Write Fuel-Saver Devices, 900 Manhattan, Dayton, Ohio."

HELP WANTED

EXTRA money growing mushrooms in cellars, outbuildings. Ready market. We assist you and give full instructions. Booklet free. Adams Mushroom Company, Dept. 160, Toronto 8, Canada.

MEN Wanting Jobs on new construction work in United States, South America, other countries, write E. Moore, 1889 Hunter Bldg., Chicago. Enclose Stamp.

WANTED—Names of men desiring steady indoor jobs; $1,700-$2,400 year; patrol parks; protect game. Write Modern Institute, M-32, Denver, Colo.

WE PURCHASE All Indianhead Pennies. Price list—$55.00. Purchasing catalogue 10c. Photonumismatic, 100 Forsyth, New York.

HYPNOTISM

HYPNOTIZE instantaneously! New dollar book 25c. Lonk Institute Hypnotism, D-1313, Palatine, Illinois.

INSTRUCTION

MEN—WOMEN, 18-50. $105-$175 month. Government Jobs. Several Winter examinations expected. Full particulars FREE. Write today. Franklin Institute, Dept. M88, Rochester, N. Y. (Established 1905.)

COPIES of 8 Successful, Jobwinning Application Letters, 25c. Business Letter Institute, AA-203 South Dearborn, Chicago.

WANTED Immediately, Men-Women, age 18 to 50, qualify for next eligibility test for steady Government Jobs; commence $105-$175 month. Common education, paid vacations, pension. Valuable information from our Civil Service Expert mailed Free. Write Instruction Bureau, 234, St. Louis, Mo., Today.

INVENTIONS

"$600.00 SAVED"—That's what one inventor says about his new book—"YOUR INVENTION—WHAT TO DO WITH IT". Don't wait until too late. Send $1.00 today. Money refunded if not delighted. Rosech & Associates, Inc., 936 University Block, Syracuse, New York.

INVENTORS, if you have good ideas, any kind, patented or unpatented, write to us at once. Absolute honesty and reliability guaranteed. This is your opportunity if you take advantage. United I. A. Inc., 14 Water St., Torrington, Conn.

HAVE you a sound, practical invention for sale, patented or unpatented? If so, write Chartered Institute, 502 Barrister Building, Washington, D. C.

INVENTIONS are the source of wealth and independence. What have you? Write National Service Bureau, Dept. H., St. Louis, Mo.

INVENTORS—Sell your ideas at National Inventors Congress April 1-4, Hotel Tulsa, Tulsa, Oklahoma. Write for details.

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Company, 582 Enright, St. Louis, Mo.

SMALL Inventions wanted. A. Hull, 7829 Euclid Avenue, Cleveland, Ohio.

LATHES

WOOD turning lathe 18" bed 4" swing $2.00 prepaid. No C.O.D.'s. Himo Mfg. Co., Sutton Rd., Millbury, Mass.

MAGIC TRICKS & NOVELTIES

HOUDINI'S Book of Magic shows how to mystify your friends. Over 50 tricks, 50c. Hollywood Specialties, Box 592, Hollywood, Calif.

FUN! "13 Funny Love Letters," 10c. Funny Fads for Funny Folks, 10c. Voices 2112 Evans, Jacksonville, Fla.

PORCELAIN Bise Dog, Ash Tray Extinguisher, 25c postpaid. Albert C. Carncross, 304 Dearborn, Buffalo, N. Y.

MALE HELP WANTED

MEN WANTED at once to call on stores with 5c and 10c self-selling 5c and 10c necessities. Strong, original counter displays. Aspirin, Mercurochrome, razor blades, household cement, etc. Automatic sellers. Many new items. Up to 125% profit. Big catalog Free. Amtrac, Dept. 95-DD, 1956 N. Troy, Chicago.

LOCAL Agents wanted to wear and demonstrate Free Suits to friends. No canvassing. Up to $12 in a day easy. Experience unnecessary. Valuable demonstrating equipment, actual samples Free. Progress Tailoring, Dept. Q 219, 500 Throop, Chicago.

MARRIED Man with spare time to distribute free samples coffee, flavoring, food products and make customers. Must devote at least two hours daily and be satisfied with up to $3 in an hour. Permanent. Blair, Dept. 63-2C, Lynchburg, Va.

DISTRIBUTORS—Supply Revolutionary Corn Remedy to stores. New Sales Plan results in landslide of orders. 150% profit. Write for exclusive franchise. Reliable Specialty Corp., Buffalo, N. Y.

EARN Quick Cash Raising Mushrooms in cellar, shed, attic. We buy crops. Guaranteed materials furnished. Easy Odorless method. Book Free. United, 3848-U Lincoln Ave., Chicago.

WORK in Alaska. Complete instructions for operating Diesel engines, steam and hydroplants, finding gold, trapping fur. All for $1.00. Erwin, 724, Juneau, Alaska.

FOREST Jobs easily available, $200 month. Cabin. Hunt, trap, patrol. Get details immediately. Rayson Service, K-32, Denver, Colorado.

MALE—INSTRUCTION

BE A Master Salesman. Six volume course. While they last $1.25 postpaid. Salesco, Box 60, Grand Forks, No. Dak.

MERRY-GO-ROUNDS

MERRY-GO-ROUNDS—New and Used Outfits. Catalog 10c. "Moore-made", LaPeer, Michigan.

MICROSCOPES

MICROSCOPES, telescopes, binoculars, America's lowest prices. Optical catalog free. Brownscope Co., 234 Fifth Ave., New York.

MISCELLANEOUS

PROTECT Your Keys From Loss! A Dual Key Check with your name and address Stamped on will usually insure prompt return of keys if lost. Also useful for other purposes. Sent postpaid, with a Key Ring, for 25c in U. S. Coin or Stamps. Print name and address plainly. Irwin Buckbowsky, 508 Oak St., Chaska, Minn.

LIQUORS, Wines." Anything you wish easily, cheaply made at home. Hundreds recipes, formulas. Interesting self addressed envelope brings full particulars. Service Bureau, Box 185, Fultonville, N. Y.

LADIES or Gentlemen: Open a "Foot Grooming Parlor" in your home. Complete course by correspondence. Evans Foot Institute, Montgomery, Ala.

1000—8½x11 Multigraphed letters with 3-line plain, printed letterhead. Bond Paper, $5.00 Postpaid. Bredin, 42 North Yorktown, Tulsa, Okla.

HOME Workers Digest 50 pages Plans, Schemes, Formulas, Tips—Copy and Free Subscription offer 10c. Box 51-M, East Orange, N. J.

GENUINE Leather Billfold. Loose change pocket, identification card, 20 cents postpaid. Edward Williamson, Macedonia, Ohio.

BLUEPRINTING Instructions, Dime. Where to get free information on 101 subjects, dime. Lewaco, Box 126, St. Cloud, Minn.

FOR SALE: Weather Bureau Thermometers and shelter, also Stereopticon. Forward, Buena Vista Rd., Bridgeport, Conn.

MAGAZINE Subscriptions: Special Savings Offers List. Mitchell's, 10407 Lexington, Kansas City, Mo.

TECHNOCRACY—Free literature for stamp. Ellis Jones, 150 South Figueroa, Los Angeles.

Rent Beds. Make your own. Small cost. Plan 25c. Williams, 5304 Newport, Detroit.

MULTIPLY NEWAY!!!—25c. Fi-nure, 510 Brokerage, D-1, St. Paul, Minn.

BIG SAW Patterns! Sample. list; dime. Frank Curtis, Idana, Kansas.

MODEL MAKING

THE MODELMAKER. The magazine for those interested in building model railroads, boats, engines. Send 15 cents for copy. Modelmaker Corp., 98M East Main St., Bay Shore, N. Y.

MODEL Makers—Brass, copper, fibre, steel and aluminum in all shapes, also castings, gears, screws and fittings. Catalog 10 cents. Experimenters Supply House, Dept. M, Box 10, Station Y, N. Y.

MODELS & MODEL SUPPLIES

ENGINES, Steam & Gas 1/10 HP up. Models, Miniature & Practical. Boilers, Pumps, Machinery, Mechanical Books. Engine Castings & Blueprints. See catalog No. 34. For Experimenters, Model-makers materials & supplies get catalog No. 35. Either postpaid 20c. Canada 30c. Refunded first order. Circular Free. Evraymesco, 28 No. Clinton, Chicago.

OVER 50 engines; castings for Locomotives, Gas, Steam Engines; Electrical Motors, Generators, Model Fittings; Miniature Valves for duplicates of large ones. Model screws. Send 25c for No. 17 Catalog. Canada 30c. Refund on 1st order. Howard, 2417 N. Ashland Ave., Chicago.

YOUR Ideas developed into practical working model. 30 years successful experience; thousands satisfied customers. Confidential service guaranteed. Bank references. Send 2c postage for 32 page book "Making Inventions Pay." Crescent Tool Company, Dept. T. Cincinnati, Ohio.

BIG PACKAGE of model airplane samples. Send dime for packing and postage. Aero Shop, 3050 Hurlbut Ave., Detroit, Michigan.

MODEL Makers Lathe. Particulars for dime. Depoy Model Works, Muncie, Indiana.

MOTION PICTURES

BARGAIN, 500-watt 16mm projectors, carrying case, beaded screen, film, $110.00 value, only $79.50 complete brand new. Order your's today. Other projectors, $3.75 up. Films 25c up. Art Sample 25c. Free 16mm. 8mm bargain list. HOME MOVIES, Box 32M, Easton, Pennsylvania.

16MM. CAMERA OWNERS. We buy all kinds of 16mm. news subjects, curiosities, oddities, etc. Send 3c stamp for details. Peerless Cine News, Suite A, 1327 North Highland Avenue, Hollywood, California.

SUPER 8mm Movie Films Chicago World's Fair. The perfect souvenir. 100', 200', 400' lengths. List for stamp. 8mm: Cartoons, travel, others. List for stamp. Lincoln Film Service, Box 293-C, Saginaw, Mich.

MOVIE cameras, projectors, films, etc., bought—exchanged—sold. Catalogue 25c; usable "screen test" $1.00. Send 6c stamps for big lists. Pacific Cine Films, Box 1504, Hollywood, California.

BOYS, a real movie machine given FREE. Have lots of fun and make money too. Send a 3c stamp for information. Pacific Cine Films, Box 1520-M, Hollywood, California.

LOWEST prices for all kinds movie film and equipment. Free developing. Send 10c for price list. Home Movies, 22 E. Van Buren, Dept. 18, Chicago.

MOTORCYCLES

ENGLISH Motorcycle Books. "Workshop," "Hints, Tips for Motorcyclists," "Speed—How Obtain" and "How to Manage Motorcycles," $1.25 each postpaid. Overhead speed heads for Fords. Send 25c for sample copy Speedway Racing Magazine, catalog English racing and stock motorcycle $150 up. Crash helmets, supplies. Clymer, 430 West Pico, Los Angeles, California.

MOTORCYCLE bargains, lowest prices, bargain sheets for stamp. Motorcycle accessories. Webster Motorcycle Supson Corp., 129 West Main St., Rochester, N. Y.

SEND 15c for illustrated used Motorcycle catalog. Large stock. Bargains. Indian parts. Accessories. Indian Motorcycle Sales, Kansas City, Missouri.

ALLOY Pistons. Harley, Henderson, Indian, Excelsior. Used parts, catalogue and wings pin 10c. Ballak, 100 N. 12th, St. Louis, Mo.

MOTOR WINDING DATA

MOTOR winders: winding data, 100 A.C. motors, special selection, various horsepower and voltage, $1.00. Motor Data Service, 3002 Monroe, Kansas City, Missouri.

OLD GOLD WANTED

CASH for Gold Teeth, Jewelry, Watches. 100% full gold value paid day shipment received. Satisfaction absolutely guaranteed or articles cheerfully returned. Licensed by United States Government. Information free. Chicago Gold Smelting & Refining Co., 331 Champlain Bldg., Chicago.

CASH for old gold teeth, crowns, bridgework, jewelry, watches. I pay the most because I refine into dental gold. Satisfaction guaranteed or shipment returned. Booklet free. United States Government. Dr. Weisberg's Gold Refining Co., 1580 Hennepin Ave., Minneapolis, Minnesota.

OLD MONEY WANTED

$5.00 to $500.00 EACH paid for Old Coins. Keep all old money. Get posted. Send 10 cents for Illustrated Coin Value Book. Guaranteed Buying and Selling Prices. Coin Exchange, Box 18, Le Roy, N. Y.

PATENTS

PATENTS—Before too heavy an outlay of time or money is made on an invention, a search of the Patent Office records should be made to determine as nearly as possible whether or not the same idea has been patented before. The cost of this search is small, while the value of the facts it develops often considerable. We offer inventors and manufacturers a thorough, prompt, confidential search service—plus experienced counsel and assistance in every phase of Patent and Trademark practice. Write for my new free book giving valuable information relating to patent procedure. Clarence A. O'Brien, Registered Patent Attorney, 254-S Adams Bldg., Washington, D. C.

PATENTS. Booklet free. Highest references. Best results. Reasonable fees. Watson E. Coleman, Victor Building, Washington, D. C.

INVENTIONS Wanted—Patented, unpatented. If you have an idea for sale, write Hartley's, Inc., Box 928-J, Bangor, Maine.

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Company, 561 Enright, St. Louis, Mo.

PATENT for the manufacturing of an improved razor strop for sale. A. Abranathy, 244 Mifflin St., Phila., Pa.

GET your own patents; legal blanks. Complete instructions $1. Cutting & Sons, Campbell, California.

PATENT ATTORNEYS

INVENTORS: Send immediately for your copy of our big, new Free book, "Patent Protection." Forty-eight pages of interesting facts. Tells how Patent Laws protect you; kind of sketch or model needed; steps to take with-out cost; how successful inventors have secured financial assistance; shows interesting inventions; illustrates important mechanical movements. Other men have read and profited by this book. With book we also send Free Evidence of Invention form, that you can use to establish date of disclosure. Prompt service, reasonable fees, special deferred payment plan. Strictest secrecy. Thirty-six years' experience. Highest references. Write us before it is too late. The facts in our book are worth money to the man with a good invention. Address: Victor J. Evans & Co., Registered Patent Attorneys, 420-C, Victor Building, Washington, D. C.

PATENT $40.00, writing, prosecuting simple patent application government fees $60.00. Samuel Goldstein, 275 E. Gunhill Rd., New York City.

WORTH while inventions are short cut to prosperity. Unpatented ideas can be sold. I tell you how and help you make the sale. Free particulars. Wm. W. T. Greene, 958 Barrister Building, Washington, D. C.

REGISTERED Patent Attorney-Consulting Engineer obtains patents and trademark registrations. Write for confidential advice Z. POLACHEK, 1234 Broadway, New York City.

PERSONAL

POEMS set to music. Published. Send poems to McNeil, Bachelor of Music, 1582 W. 27th, Los Angeles, Cal.

FORTUNES await unlocated heirs! Handbook list 25c. International Agency, Cincinnati.

IMPROVE your personality. Free information. Flow, 6018M Quimby, Cleveland, Ohio.

PHOTO DEVELOPING

FILMS developed 5c per roll; prints 1 each. Ask for Special Bargain List. Roanoke Photo Finishing Company, 159 Bell Avenue, Roanoke, Va.

PANCHROMATIC or other type roll developed and eight prints 25c. Additional prints 2c each. Maclare Studios, 6546-B Kimbark, Chicago.

"EARN your photo-finishing, and more. Full details for a dime. Easy, pleasant work. Dept. M, Sunshine Studio, Vaden, Illinois."

PHOTOGRAPHY

PORTRAIT Stamps (miniature), used on correspondence and calling cards, $1.00 per hundred. Satisfaction guaranteed. Send photograph to Wichita Photo Copy, 1324 S. Market, Wichita, Kansas.

AMATEUR PHOTOGRAPHERS. Income from your camera. Any size. Working Dept., and sample, 50c. L. Fisher, 1927 West Fourth, Williamsport, Penna.

REALISTIC photographs pay big money. 20c secret list of buyers. Dowling, Dunellen, N. J.

PIANO TUNING

PIANO TUNING learned at home quickly. Tremendous field! Have a years-around business of your own. Be independent! Information free. Write Empire School of Piano Tuning, 111 Kimball St., Hammond, Ind.

POEMS—SONG WRITERS

NEW DEAL. Write Sequoia Songwriters Service. Sherman Branch, Los Angeles, Cal.

WANTED: Original Poems, Songs. MMM Publishers, Studio Bldg., Portland, Ore.

PRINTING

STATIONERY — Watermarked bond paper. 200 note-sheets, 100 envelopes, printed name, address, $1.00 postpaid. Edw. Merk, 5406 Cornell Ave., Chicago, Ill.

500 LETTERHEADS, envelopes, billheads, statements, blotters, $1.75. Illustrations. Breidshaw, 3214 Huron, Chicago.

PROPELLERS

PROPELLERS—All Types, $1.75 up. Watson, 1412 Cleveland, Jacksonville, Florida.

RADIO AND TELEGRAPHY

GOVERNMENT gives free Radio Operators' training for service on aircraft, ships. Salary, expenses paid. Information booklet, how to qualify, apply 20c. Continental, Box 344A, Indianapolis, Ind.

RADIO Engineering, broadcasting, aviation and police radio. Servicing, Marine and Morse Telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, King St., Valparaiso, Ind.

MILLION Point Supersensitive Radio Crystals, one thousand mile range. Set instructions included. Price 50c postpaid. Radio Supply Company, Edmonton, Alberta.

FREE—Radio and Morse Telegraphy Book. Learn code in short time. New easy method. Fisher Electric Company, 3801 Riverside Ave., Cleveland, Ohio.

SPARE time radio repairing is easy, with tester built for $5. Parts list and instructions (coin). McGuire, Box 163, Washburn, N. D.

GUARANTEED short, long wave Radios. Cabinet, dynamic speaker. Complete $14.95. Western Radio, Anaconda, Montana.

LEARN the Telegraph Code. Build your own Instrument complete for 10c. Instructions 20c. Ock, 5728 13th Court, Kenosha, Wis.

SHORT Wave Sets, Kits, Supplies, Wholesale catalog, 5c. Federal Telegraph, Box 1064, Indianapolis, Ind.

POCKET Radio Kit 50c. Plans 10c. Radio Sales, Box 68, New Haven, Conn.

ALL Wave set $1.50. Plans 25c. Radio Sales, Box 68, New Haven, Conn.

RADIOS FOR SALE

RADIOS wholesale! Latest models—all guaranteed. Catalog. Bart, Knoxville, Tennessee.

RAZOR BLADES

RAZOR Blades sharpened extra keen, 1c each. Pete Wetterquist, Rockford, Illinois.

REAL ESTATE

OZARKS—Five acres timbered river frontage, fishing, boating, pearling, shooting—$100, $5.00 monthly. Hubbard, 224 Grosvenor Bldg., Kansas City, Kans.

ROOTS AND HERBS

WANTED—Common weeds by steady buyers! Details 10c International Agency, Cincinnati.

JUST OUT! World's greatest "Herb Almanac." Beautifully illustrated in natural colors. Contains over 500 old-fashioned herb medicine recipes and Indian secrets for home use. 10c (coin) postpaid. Worth dollars! Bontanics, 145 W. 112th St., Chicago.

RUBBER STAMPS

NAME and Address 25c. Three lines 35c. Ideal Stamp Works, Coeur d' Alene, Idaho.

SALESMEN WANTED

DON'T BE A JOB HUNTER—Start your own business on our capital. No hard times; no lay-offs, always your own boss. Hundreds average $3,000 to $5,000 annual sales after a few weeks. We supply, stocks, equipment on credit. 200 home necessities. Selling experience unnecessary. Wonderful opportunity to own pleasant, dignified, profitable business backed by world wide Industry. Write Rawleigh, Dept. C-U-MOM, Freeport, Ill.

BIG MONEY opportunity! Permanent. EXPERIENCE UNNECESSARY. Pay weekly. Year round profits. Fascinating outdoor work. Full or part time. Unlimited field. Complete outfit free. Brown's Nurseries, Dept. 119, Rochester, New York.

NEW—Different Pinless Curtain Stretcher—Curtains attached in 30 seconds. Low priced. 100% Profit. Miniature Sample Furnished. Write Evans Co., Dept. MC-21, Cincinnati, Ohio.

STRANGE Chemical Sponge cleans wallpaper like magic. Banishes house cleaning drudgery. Women amazed. Hustlers cleaning up. OUTFIT FREE. Kristee Mfg., Box 2492, Akron, Ohio.

WANTED: County salesman with car, to demonstrate and service for large Ohio manufacturer. First-Class job. 244 Fyr-Fyter Co., Dayton, O.

SHOP KINKS

1935 HANDY Man's Home Manual. Send 50c to Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn.

TRAILERS

"WANDERER" Cabin Trailer plans are in 1935 Handy Man's Home Manual, 146 page book chock full of auto, radio, workshop, home, and garden projects and handikinks, sent postpaid for 50c. Modern Mechanix Publishing Co., 529 So. 7th St., Minneapolis, Minn.

TREASURES

RADIO Treasure Finder Tricks Exposed and Explained by original builder. Send SILVER DIME. G. O. Maher, Baton Rouge, Louisiana.

TREASURE FINDERS

LOCATE GOLD, SILVER, OIL, 20 scientific ways given in 150 page illustrated book on Buried Treasures. Included FREE are two latest Radio Treasure Finding Plans, and $3 value famous Mineral Rods, all for $3. Or: Complete Placer Mining Book with Rods FREE $1.75. Enclose 50c on C.O.D. orders. Pacific Artcraft Co., 204-C, San Bruno, Calif.

TYPEWRITERS

NEW Portable and Rebuilt Standard Size Typewriters at Cut Prices. Typewriter Exchange, Sac City, Iowa.

VENTRILOQUISTS

LEARN Ventriloquism by mail; small cost, 3c stamp brings particulars. Geo. W. Smith, 125 North Jefferson, Room S-624, Peoria, Ill.

WELDING

ATTENTION Welders! Dodge generator makes 150 amp. Welder. Two makes 300 amps. Uses larger case. Extra parts reasonable. Single unit $75.00. Double unit $125.00. Copyrighted blueprints, $2.00. "Buildit," Box 1181, Denver, Colorado.

SPEED-E-ARC Electric Welder. 75 ampere. Built from automobile generator. Complete instructions and proven blueprints $2.00. C. W. Carlson, Dept. M, 3212 Grand Ave., Omaha, Nebr.

ARC-WELD Generator. Built from Dodge generator, Practical, Inexpensive, conversion instructions, $1.00 (currency). Thomas Electric Shop, Douglas, Arizona.

ARC-WELDING Outfit $1.25. Weld fenders, braze, solder. Lavrow, 4368-W, Warren, Detroit. Stamp appreciated.

WIND BATTERY CHARGER

WIND Electric Charger. Build yourself from our kit of parts, or send $1.00 large blueprints. Lorenzen Propeller Company, Niles, Michigan.

MAKE wind battery charger for lights. Construction plans 25c (coin). Robert McNeill, Jr., Hopkinton, Iowa.

WIND ELECTRIC LIGHTS

COMPLETE Electric Plants, Propellers, Generators, Batteries, Motors, Towers, Ampmeters, Relays, Pulleys, Building Plans, many other Parts at Bargain prices. Particulars Dime. Klinsick M. Shop, Optima, Okla.

SCIENTIFICALLY designed 10-ft. (or smaller) Airfoil wind-driven propeller. Blueprints, detailed instructions, six full-size templates, $1.00 bill. Particulars for stamp. Howard Marks, Alexandria, Nebr.

ELECTRIC Lights—Wind Driven. You build them. Simple direct drive. Automatic control. Copyrighted blueprints. Write. Wind Motor Electric, Ridgway, Montana

WIND ELECTRIC. 32, 6-volt outfits. Propellers, Generators. Details 10c, refunded on order. Propeller Man, Kindred, No. Dak.

WRITERS

WANTED: 100 New Writers wishing work on Newspapers, Magazines. FREE information. Enclose stamp. Press Association, 3806 Beverly, Los Angeles, California.

FREE Blueprint Booklet

Now is the time to order plans for that boat and auto camping trailer you're planning to build this spring.

Modern Mechanix Publ. Co.
529 S. 7th St., Minneapolis, Minn.

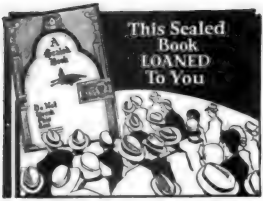
Please rush my free copy of the 1935 MM Blueprint Booklet. I am enclosing a 3c stamp to cover mailing.

*Name*_____

*Address*_____

*City*_____

*State*_____


This Sealed Book LOANED To You

THOUSANDS EVERYWHERE ACCLAIM THIS

New Psychology Of Life!

Have you unrealized hopes? Does the tomorrow of your ambitions and desires never seem to come? Are the better things of life always just beyond your reach?

Times have changed—but have you? Change your old form of thinking. Adopt a new psychology of life and MASTER YOUR PROBLEMS. It takes no greater mental effort to achieve results when you know how.

Let the Rosicrucians show you, as they have thousands of others, how by the use of simple laws you can apply the same powers of your mind to bring about startling changes in your life. If you are sincere in your desire, address a letter for the free Sealed Book. It will point out how you may obtain this most helpful information. **Address: Scribe T. W. D.**

The Rosicrucians
-AMORC-
SAN JOSE, CALIFORNIA.

Perpetuating the Ancient Rosicrucian Secret Teachings

Big Chance for ELECTRICAL ENGINEERS

NOW Here's great news for anybody interested in Electricity. BRAND NEW edition of Applied Electricity brought right down to date with every NEW Electrical subject fully covered. 10 big Volumes and all shipped FREE for examination.

Big Field—Big Demand—Big Pay

Men who understand electricity are urgently needed right now in thousands of industries. Autos, airplanes, machine shops—practically every industry depends on electricity and men who know this subject make big money. Pleasant, fascinating work, easy to learn and do; learn quickly with these books. Send coupon for a set for FREE examination and see for yourself.

10 Big Books Shipped FREE FOR EXAMINATION

American Technical Society, Dept. E-3320, Drexel at 58th St., Chicago

Send for 10 days' free use, BRAND NEW 10 volume set of Electrical Engineering. In return for mailing this coupon promptly, send free, certificate of membership in the American Technical Society entitling me to full consulting privilege for one year. I will pay the few cents delivery charges on the books. If I wish I may return them in 10 days and owe you nothing, but if I keep them I will send $2.00 after 10 days, then $3.00 a month until the special price of only $29.80 is paid.

Name.....

Address.....

City..... State.....

Attach letter stating age, occupation and name and address of employer and at least one business man as reference.

Television Will Carry the Mails

[*Continued from page* 38]

down into hundreds of dots and dashes. It is reproduced by light "brushes" that "paint" it line for line. The next step is to flash the complete picture.

The first logical step, of course, is to transmit still pictures and print. That is facsimile radio. The next step will be to send moving pictures. That is television. When the latter is accomplished, it will be possible to see a face or an object through space and to reproduce a newspaper page instantaneously.

The problem of facsimile transmission has not been merely one of circuits and terminal apparatus. Typewriters and recorders have been available, but we needed a successful track to link the transmitter and recorder.

Short Waves Transmit Over Seas

This we have in the short waves used to transmit across the sea and continent. Now we have the micro-waves for inter-city communication.

I am certain that progress will be rapid. Within the next year we expect to have in operation the micro-wave domestic facsimile circuit between New York and Philadelphia for which an experimental license has been granted. The short wave oversea channel has already proved its value in flashing news pictures between Europe and America.

The day will come when radio will dip into the mailbag. If a letter is worth the time required for dictation, for the stenographer to write, for re-reading by the sender and the cost of the stamp, then it is worth fifty cents or a dollar to flash it across the world for quick delivery and immediate answer.

I believe thousands of letters and messages ultimately will fly from city to city, from country to country by facsimile radio.

Television Study Aids Facsimile

The study of television has aided facsimile broadcasts. What has been learned by facsimile research has advanced the prospects of television.

The demand for pictures in all parts of the world of the recent Morro Castle catastrophe taxed the capacity of our oversea facsimile system. A greater number of photos were projected through the air that week-end than ever before in the history of photoradio.

Our international facsimile service now being utilized on the normal short-wave channels, between 15 and 100 meters, is making use of new instruments to improve considerably the texture of the photograph.

In this facsimile system perfected by our engineers, a pin-point beam of light is made to play through lenses on a photograph wrapped around a slowly revolving cylinder.

The light beam strikes the paper like a tiny

[*Continued on page* 142]

Bridges Span San Francisco Bay

[*Continued from page 45*]

Here it was necessary to carry on underwater excavation to a depth of 242 feet below the water in order to obtain suitable foundation in the bed of clay.

A compressed-air-flotation caisson enabled the bridge builders for the first time to construct the pier from the surface of the water down.

With the completion of all underwater and structural work, the bridge is rapidly entering the aerial stages.

Golden Gate Bridge

At the present rate, it is expected that the work will be completed in August, 1936, six months ahead of the contracted time.

The Golden Gate bridge, costing $35,000,000, has not only the longest suspension span, 4,200 feet, but it is the only bridge in the world authorized to be built across the outer mouth of a major ocean harbor.

Gracefully swinging in an inverted arc 220 feet over the harbor, this bridge has a highway with a daily capacity sufficient to handle a string of automobiles reaching from the Oregon Line to the Mexican border, moving at a speed of 22 miles per hour. The roadway to the bridge is graded up in easy, sweeping curves, narrowing to a 60 foot, six-lane highway over the bridge proper. Two 10½ foot sidewalks occupy the remaining space.

The toll terminal has 16 gateways and 12 toll booths to facilitate quick handling of fast moving traffic.

The two towers, one at San Francisco and one at Marin, are identical, each 121 feet wide at the bottom, 846 feet high, and 746 feet above the mean high water level. They are the highest bridge towers in the world—150 feet higher than those on the George Washington bridge in New York City.

Construct Largest Fender

Engineers throughout the world have been watching the construction of the pier and fender off the Fort Point shore in 100 feet of water which is pronounced the most difficult piece of underwater work ever undertaken by man. To complete this task, a steel fender, 750 feet in circumference was set into the sea—a fender as large as the University of California stadium. Such fenders not only make it possible to pour the piers, but they also provide permanent protection after the bridge is finished.

The concrete work on the piers and the two giant 64,000 ton anchorages required 254,709 cubic yards of cement. The greatest barge fleet ever assembled on San Francisco Bay for a single job was paid $1,300,000 for conveying the concrete to the bridge. They carried enough of the mixture to build a sidewalk five-feet wide from San Francisco to New York.

COMPLETE PLANS

FOR A PERMANENT PROFITABLE BUSINESS OF YOUR OWN *free*

MAKE $30 TO $40 A WEEK

Our free plans show you how to build a successful business of your own sharpening lawnmowers. No experience necessary. Most men average from $30 to $40 a week. J. B. Van Dien, Ridgewood, N. J., writes: "Some weeks I earned $40 a week with my Ideal just as a side line." H. Greenlau, Fond du Lac, Wis., writes: "In May I sharpened over 200 mowers at $1.00 each." Niles C. Race, Rochester, N. Y. writes: "I have sharpened 785 mowers at $1.00 each."

THE IDEAL LAWN MOWER SHARPENER

Makes old, dull lawnmowers cut like new. Mowers run easier, stay sharp longer—customers come back year after year. Start right at home. Attach the Ideal to your lamp socket. Sharpens any make of mower in 15 to 20 minutes—you get $1.00 to $1.50. Attachements for grinding skates, grass shears, hedge shears, sickles, scythes, axes, etc.

Send Post Card for

FREE CATALOG

and complete plans

THE FATE-ROOT-HEATH CO.
255 Bell St. Plymouth, Ohio

NEW METHOD GUN BLUER

Makes old guns like new.

Will not injure the finest steel. No heating is necessary. Restores the finish on 5 guns in ten minutes for $1.00

Send for circular "What Gunsmiths Say"

New Method Gun Bluing Co.
Dept. NMB-27, East Method Bldg.
BRADFORD, PA.

BUILD A FRONT DRIVE!

You can now build your own midget front drive auto, for racing or sport use, with the simplest drive, using "T" Ford parts and few tools.

With the plans now available, this 4 wheel brake, front drive, can be built at home, using your motorcycle motor and other car parts.

Made without the extensive machine work found in cars of this type, this "Silver Bullet" can be built by almost anyone and most economically.

Send stamps for further details.

E. A. BORNTRAEGER
3450 NO. MARSHFIELD AVE.
CHICAGO, ILL.

Be a TELEVISION EXPERT

America's pioneer television training institution

Free Folder

WEAL is the ONLY visual broadcasting station in the country offering a training in television.

Learn television at WEAL, a government licensed station. Big opportunity is just ahead. Perfected home television sets will suddenly appear on the market on the NEXT BIG BUYING WAVE. Get your training now at the only television station in the nation where you can get experience while programs are broadcast. Learn to operate the transmitter; studio technique; control room operation; television engineering. Let us help you in doing the real thing. Get this experience that counts today when you get a job that pays real money.

Through training eligible for amateur license (radio telephone 1st class). You must have a license to operate a radio or television station.

Business leaders predict that New Television system of broadcasting will require thousands of transmitters and relay stations. Here's opportunity for thoroughly trained television technicians and artists.

Write for free folder "Pictures on the Air". Just sign and mail coupon NOW!

BIG FUTURE

USE COUPON

FIRST NATIONAL TELEVISION, Inc.,
602 Power & Light Bldg., Kansas City, Mo.

Without obligation, send postpaid FREE Illustrated Folder "Pictures on the Air" telling about new opportunities in television. I am 17 years or older.

Name ..... Age .....

Address .....

INVENTORS PATENT YOUR IDEAS

SEND FOR FREE BOOK

HOW TO OBTAIN A PATENT, written by a Former Member of the Examining Corps (1922-24) of the U. S. Patent Office. If you want to profit by your ideas, you should take steps to apply for a U. S. Patent at once. Your first step is to get this Free Book. This interesting illustrated book contains valuable information you should have. It tells you fully how to obtain a patent on your idea in the quickest way. With this Free Book you will also receive a "Record of Invention" form on which you can easily record your idea. Personal and Confidential Services. Your Case will be personally handled only by a Registered Patent Attorney who is also a Former Member of the Examining Corps of the U. S. Patent Office. All communications will be strictly confidential.

MAIL COUPON TODAY FOR FREE PATENT BOOK AND RECORD OF INVENTION FORM

MILLER & MILLER

REGISTERED PATENT ATTORNEYS
FORMERLY IN EXAMINING CORPS U. S. PATENT OFFICE

1638 Woolworth Bldg., Dept. 35B, New York City
Miller Building, Dept. 35B, Washington, D. C.

Please send me your Free Book, "How to Obtain a Patent," and "Record of Invention" form.

NAME .....

ADDRESS .....

New Power for Mechanical Toys

[*Continued from page* 87]

together enabling boys to make various articles with pieces of heavy wire cut to different lengths and angles.

The four runner sled has been a big seller for years and vast sums of money have been made with it, but sleds of this type cannot be turned abruptly enough.

The makers of carts and coasters are looking for a revolutionary spring suspension that would be cheap enough to use in connection with articles of this nature.

Who can make a device for attachment to toy steam-electric locomotives that will make them sound like real steam engines! We have the power to drive such a mechanism. All we need is the sound. It would be a big seller.

A new means of driving toy automobiles, trains and other things of this nature is needed. It may be that compressed air can be made to do the trick.

An electrically-driven captive airplane that will circle about a post, the electric feed wires holding it in position, can be sold for five dollars and it would bring in a very comfortable royalty.

A toy submarine that will periodically dive and come back to the surface would be a big seller and a real money maker. The action, unlike that in submarines which to do this, would have to be entirely automatic.

A machine gun that will fire wooden slugs from a cartridge belt would be a fascinating toy for older boys. It should be possible to make a very simple mechanism for this purpose.

Television Will Carry the Mails

[*Continued from page* 140]

star, each twinkle of which assists in "painting" the picture being flashed to some distant city. A photo-electric cell close to the light beam is instantly affected by the gradations of light from pure white through grays to inky black reflected from the revolving picture.

As the star moves across the face of the picture being transmitted, the variations of light intensity picked up by the photo-electric cell are greatly strengthened by an amplifier and made to modulate the transmitting aerial. That puts the picture on the air.

The process is reversed at the receiving end. A small pin-point beam of light plays across slowly revolving drum upon which is wrapped either a piece of photographic bromide paper or a photographic film.

As rapidly as the picture is completed it is passed through a hole in the wall of the operating room into a dark-room for development by standard photographic methods. It is then ready for delivery by messenger.

WILL YOU Wear *this* Suit!

Be My Local Agent

UP TO $12 IN A DAY

How would you like to wear this fine, made-to-measure, all wool suit at my expense? Pay no money. Just promise to show it to friends, and follow my simple plan. Do it as easy thing and earn up to $12 in a day, without canvassing! Represent my big, old tailoring company. Make biggest money of your life. I need an ambitious man in every town.

EXPERIENCE NOT NECESSARY—ACTUAL SAMPLES FREE

I send you **absolutely free** gorgeous, valuable big demonstrating equipment containing **actual samples** and dozens of valuable surprises. Demonstrate these samples for me. Show World's Greatest Tailoring Values. Save money for friends. Make money yourself.

Write! Send No Money! Do it now. Get valuable demonstration equipment FREE and opportunity to get your own suits and overcoats FREE. Write today.

H.J. COLLIN, Dept. Q137
Progress Tailoring Co., 500 S. Throop Street, Chicago

FORD FOR YOU

Pay me money. Get Ford. Write today for new Ford FREE.

INVENTORS

SEE PAGE 12

at last **CARTOONING** MADE EASY

NEW, ORIGINAL, COMPLETE COURSE especially prepared by one of today's cleverest newspaper and magazine Cartoonists. Full of punch and interest. 20 fascinating lessons; hundreds of step-by-step Cartoons. Complete course only $2.75

Get into this fascinating field from the start, either for fun and spare money or to become a professional Cartoonist! Money back guarantee. Or, send for Free details. Don't delay.

THE AMERICAN SCHOOL OF CARTOONING
Dept. 33 614 West Austin Ave. Chicago, Ill.

GOING BALD?

Don't waste money on hair oils and tonics, etc. You may save your hair if it has not all fallen out. Dr. Dorsey's new scientific system of hair restoration is simple, effective. Endorsed by physicians and schools. My book on Baldness, Cause and Prevention, tells how. This book is result of dissection, examinations and clinical investigation. Sent for 10c. coin or stamps. Write Dr. B. L. Dorsey, M. D., Dept. 32, Fullerton Bldg., St. Louis, Mo.

BUILD IT YOURSELF-PLANS

Jim Dandy Cabin Trailer Classy! Roomy! Easy to build in any size at low cost! Accommodates 2 to 4. Plans and instructions, only $1.00—include all diagrams, sketches, photos, material list, etc. Big value for all interested in trailers. Send today!

MAIL DOLLAR BILL to JIM DANDY, Box 125-C, WAUSAU, WIS.

ALL PLANS AND INSTRUCTIONS for $1.00

INVENTIONS WANTED!

Patented or unpatented inventions are wanted by nearly 1000 buyers whose names and addresses are given in the **Inventors' Selling Guide** by Raymond Francis Yates. This amazing book gives valuable sales tips, explains tested method of presenting unpatented ideas for small sums, contains **Contracts that Protect the Inventor, Financing Your Invention, Gyp Schemes to Avoid, Finding Buyers, Getting the Most for Your Idea,** scores of other vital topics by a man who has helped 20,000 inventors. Invaluable for the time you can't waste money and the money you can't waste. 250-page book sent postpaid for $2 or C. O. D. if desired. **FREE LIST OF NEEDED INVENTIONS** and full details sent on request.

Three other big books for inventors: **Protecting and Selling Unpatented Inventions—Edison's Secrets of How to Invent—160 Million-Dollar Ideas for Inventors.** 50 Cents each, or all three for $1.

DONLEY PUBL. CO., 509 Fifth Ave., Dept. M3, New York, N. Y.

Be a RADIO EXPERT EARN BIG MONEY

LEARN IN 10 WEEKS

The great and ever-expanding field of Radio — **Broadcasting, Television, Talking Pictures, Aviation Radio, Radio Servicing** — offers steady employment and a real future for young men who have the ambition to succeed. The famous **Coyne "Learn-by-Doing" Method** of training offers you the chance of a lifetime to quickly get into this fascinating, big-pay field. In 10 weeks training in the Great Coyne Shops in Chicago will qualify you. Coyne Graduate EMPLOYMENT SERVICE will help to PLACE YOU IN THE JOB YOU ARE TRAINED FOR. Start anytime you like.

I'LL FINANCE YOUR TRAINING

If you are short of ready cash don't let that hold you back. I will finance your training. The course takes only 10 weeks — but you don't start paying me back until FIVE MONTHS after you start school or 2½ MONTHS after regular training period. Many earn while learning. Complete course in ELECTRIC REFRIGERATION AND AIR CONDITIONING included at NO EXTRA COST to those who enroll now. Write today for my Big FREE Illustrated Catalog and full details of my amazing **"Pay After Graduation"** offer — No obligation.

H. C. Lewis

SEND NOW FOR FULL DETAILS

MR. H. C. LEWIS, President, Coyne Schools,
500 S. Paulina St.— Dept. 35-14 Chicago, Ill.

Send me the BIG FREE Illustrated Book explaining your Radio Course, special offer and Scholarship Loan Plan.

Name.....

Address.....

City..... State.....

TRAVEL FOR "UNCLE SAM"

New Bandit Proof Railway Mail Car

Start $1900 Year

U. S. GOVERNMENT JOBS

Men—Boys, 18 Up

Railway Postal Clerks—Carriers—Clerks—Liquor Gaugers

Many Winter and Spring Examinations Expected

FRANKLIN INSTITUTE
Dept. M-304, Rochester, N. Y.

COUPON

Gentlemen: Rush to me without charge 32-page book with list of U. S. Government positions paying $1260 to $2190 a year to start. Advise me regarding the salaries, hours, duties, vacation and tell me how to get a position.

Mail Coupon —Today SURE

Name .....

Address .....

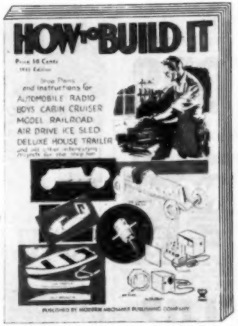
THE BOOK FOR EVERY SHOP FAN

THE NEW 1935

HOW TO BUILD IT

COMPLETE PLANS AND INSTRUCTIONS FOR
149 HOME SHOP PROJECTS

BOATS
AUTO RACERS
RADIOS
FURNITURE
TRICKS - GAMES
AUTO TRAILER
PHOTOGRAPHY
MODELS
TOYS



ONLY

50c

AT ALL
NEWSSTANDS

A valuable reference manual containing dozens of big plans, each of which are worth far more than the price asked for the entire book.

GET YOUR COPY NOW

If Your Dealer is Sold out Send 50c to

MODERN MECHANIX PUBLISHING CO.

529 South Seventh Street MINNEAPOLIS, MINN.

Falconry Is Newest Hunting Sport

[*Continued from page* 128]

again, and the whole process is repeated until hunger drives him to attack the lure instantly.

As the training proceeds, the lure is thrown farther away, and the bird is forced to fly a longer distance for his food, always with a line attached to his jesses. He has become accustomed now to darting at his food, and returning to his master's wrist. When he has learned these lessons (which are the essential points in falconry, and must be patiently repeated every day for a month or more) he is ready to be despatched "free," or unleashed, at the distant lure.

First Flight is Crucial Test

Now for the crucial test of entering your bird, that is, despatching him after live quarry. This should be done on a windless day in open country, free as possible of woods and hedges. Relieve the bird of hood, swivel, and leash, and hold it only by its jesses, which should be grasped firmly between thumb and forefinger as the bird sits on your fist. If there is no natural game present—such as wild geese, sparrows, or even a crow—it is quite legitimate to have your assistant (known as a "cadger" in falconry) place a pigeon in a clump of bushes. At a signal, the cadger "throws up" the pigeon, which starts off into the air with a whirr of wings. The white flash catches your falcon's eye; he fairly catapults himself from your fist, and—if he is a true duck-hawk—will soar high above his prey, hovering over it at an altitude of 1,000 feet. Then with a rush and a jingle of bells, he "stoops" to his quarry, descending upon it like a plumed arrow and breaking its neck with a single blow of his claws.

Use Lure to Tempt Bird Back

Your hunting bird now circles back to your wrist, where he is immediately hooded. If he does not come back, but flies into some nearby tree, there are two ways of bringing him down. The first is by flashing a large brass buckle at him (the buckle is worn as part of the falconer's rig) a signal to which he usually responds. If this fails use the lure on him.

An aspect of falconry that may appeal to many Americans, is the catching and training of these hunters-of-the-air for wealthy sportsmen. A rich easterner of my acquaintance recently offered $2,500 for a brace of falcons, but not a single trained bird could be found at that, or any, figure. In England, where the sport is more highly developed, a falcon fetches a price of $350 to $500. Falconry is coming fast in the United States, and the man who begins now to learn the art of snaring and training hawks is almost certain of a good income when the sport takes a firmer root in our country.

DIVORCE EYE CRUTCHES!

Get RID *of the Spectacle Handicap. The* NATURAL EYESIGHT SYSTEM *makes Victory over Glasses Possible.*

You are the Judge—your eyes the Jury—when the *Natural Eyesight System* goes on trial in your home for four months on our 100 MONEY-BACK GUARANTEE.

Full Information Mailed FREE

Natural Eyesight Institute Inc.

Dept. 53-E. Los Angeles, Calif.

BE A RAILWAY TRAFFIC INSPECTOR WRITE TODAY

A REAL, WELL-PAID JOB FOR AN AMBITIOUS MAN

TRAINED MEN—19 to 60—are wanted in the *Railway and Bus Passenger Traffic Inspection Field.* You can quickly qualify by spare time study of interesting, home-study course. We will place you in position at up to $140 per month, plus expenses, to start, or refund tuition. Rapid advancement with experience. Free Booklet describes our 16-yr. record.

STANDARD BUSINESS TRAINING INSTITUTE

Div. 9103 Buffalo, N. Y.

GET YOUR TRACTOR AT FACTORY PRICE

3 Speeds forward and reverse

Runs 4 to 8 miles per hour

Here's an amazing money maker for farms, truck gardens, orchards, nurseries, poultry ranches, country homes, etc. Plows, discs, harrows, cultivates, mows lawns, cuts tall weeds. Runs belt machinery. Does work of many men. 1 to 8 plow capacity. Three sizes. Write nearest office for FREE CATALOG. Low Factory Prices and 10 Day Trial Plan.

Gatesboro, Kansas Columbus, Ohio

Air Tires or Steel Wheels

SHAW DU-ALL TRACTOR

NEON SIGNS WHY? HOW?

Big Opportunity in the Neon Sign business! Learn all the how and whys in this complete practical home-study course. FIVE PARTS—160 large size pages, over 150 illustrations. Covers all branches: Glass Bending, Transformers & Circuits, Neon Tubes, Service Work—EVERYTHING! Never before obtainable at any price—now yours at a small fraction of former cost. Send no money—pay postman $4.95 when you get it. Learn it in this complete, non-technical course—ONLY $4.95, postpaid to your door! Send Now! Don't lose out by waiting. Mail check, express or postal money order—TODAY!

COMMERCIALITE LABORATORIES. P. O. Box 47, Omaha, Nebr.

FOR INVENTORS ONLY!

WE CAN'T teach you how to be an inventor — but if you have an inventive turn of mind, this new International Correspondence Schools Course in Inventing and Patenting *will* teach you *all* the basic knowledge you must have in order to earn real money from your talents. Prepared by experts — study in spare time! 50,000 patents issued yearly in the U. S. — why shouldn't some of them be yours? Mail the coupon — today!

INTERNATIONAL CORRESPONDENCE SCHOOLS

BOX 2324-B, SCRANTON, PENNA.

Explain fully about your course in the subject marked X:

☐ INVENTING AND PATENTING

☐ Chemistry
☐ Radio
☐ Aviation
☐ Refrigeration
☐ Air Conditioning
☐ Architecture
☐ Accountancy
☐ Advertising
☐ Electrical Engineering
☐ Drafting
☐ Show Card Lettering
☐ Good English

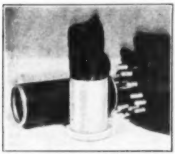
Name ..... *Age* .....

Address .....

INDUSTRY PROFITS WITH NEW IDEAS

With an eye to the New Year's football game in Rose Bowl, an alert Pasadena dairyman dispensed milk to his customers in a cone-shaped, waxed-paper bottle which, with the bottom cut out, served as a handy megaphone.

Noiseless antenna systems for all wave reception are said to be perfected in a small unit mounted alongside the antenna and ground posts of a receiver by means of its base lugs. Adjustment brings precision balance between antenna and receiver for greatest selectivity and loudest signal with a minimum of noise.



This rubberized silk umbrella has a hollow handle containing a pair of women's toe rubbers.

Saw horses that will not wobble or collapse are quickly set up with triangular metal brackets which fit over the legs and clamp the crossbar.

A classified guide of everything carried in a grocery store is designed for the grocery counter as a sales suggestor. It is very small and concise. Using 16 pages with 19 classifications, it may be read at a glance on "visible indexed" pages.

A simplified air conditioning unit, said to be adaptable for any type furnace, can be installed by any plumber and operates at a total cost averaging less than one cent per day.

Kayaks, light Eskimo crafts handled by a long double paddle, non-sinkable and almost impossible to upset, are sold in complete kits which can be assembled in a short time.

A new battery charger designed for home use, may be clamped to the battery without removal from the automobile. Operating at 10 amperes, it is said to charge the average battery over-night at a total cost of less than five cents.

An electric outboard motor, running on from six to twelve volts from a storage battery, will propel an 18-foot boat either forward or backward at a reasonable rate of speed.

A tire calculator takes into consideration the size of the truck and the payload to determine, exactly and quickly, the proper tire sizes for various uses.

A new rachet type pipe threader, designed for work where a two-handled threader cannot be used.

A new cellophane insulation has been developed for electric wires which is said to provide the same insulation properties as cotton winding without occupying as much space. Adhesive is first applied to the wire. Then it is wrapped in cellophane, lacquered and baked to form a tough, resistant insulation.

Motors, either spring or electric, are available for toy boats. The electric motor has a permanent magnet and a reduction gear, and operates on 3 volts current furnished by two ordinary flashlight batteries.

A new bridge table features a score pad that springs into the view of all players, a lamp arching over the center of the table, and ash trays suspended rigidly from the corners.

Crystals, in trough, melted by heat of electric light, vaporize to purify the heavy atmosphere of the room.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending stamped, addressed envelope to Modern Mechanix and Inventions. *Manufacturers are invited to submit photos and literature for this page.*